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ORIGINAL ARTICLES.

ONE HUNDRED CASES OF TYPHOID FEVER.[1]

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THE following remarks are based upon an experience of one hundred cases of typhoid fever which came under my observation in the wards of the Montreal General Hospital. The histories have been taken from my case-books, working backward from the present day. No selection has been made, except that I have put aside all incomplete histories, as well as those in which there was any doubt of the diagnosis. Such a plan of selection necessarily raises the mortality-rate, since all fatal cases were fully recorded, while many non-fatal cases escaped mention.

The period covered by these one hundred cases extends over part of the summer services of 1884 and 1885, part of 1886, all of 1887, part of 1889, and the winter service of 1889–90, and includes the severe epidemic of 1886–87, when the hospital authorities placed a large number of fever patients in tents, a necessity to which they had not been forced since the typhus fever visitations of the last generation. In the summers of 1888 and 1889 the number of typhoid cases in hospital at a time was limited to twenty. The one hundred cases, therefore, represent a selection of severe cases: 1. Because the Montreal General Hospital performs the duties of a city hospital, a marine and an immigrant hospital, and admits all sorts of men in all conditions of poverty and exhaustion. 2. Because, being always overcrowded, and the number of admissions latterly being limited, mild cases and those occurring among the fairly well-to-do are refused admission. For the same reason, children whose parents have homes are not often found among the patients, and in children the mortality is lower than in young adults. 3. A cause for high mortality lies in the fact that in the summer a patient is enabled to work longer with the disease in him than he would be able to do in the severe winters of Canada.

Age.—The mean age was 24.8 years. The extremes were 5 and 45. The age of 77 patients was between 20 and 30 years, and but 9 patients were over 30 years. I wish to lay great stress upon the narrowness of the age-limit, for it explains how the disease fails to communicate itself among persons of different ages. I shall refer to this point again.

Mortality.—Sixteen patients died.

Infection.—Is typhoid fever directly communicable? I believe it is, and my reasons for so thinking are as follows:

1. That a large number of house-officers of the Montreal General Hospital have contracted typhoid fever while on duty. During the last twenty years 39 have served on the house-staff, and of these I have been able to ascertain that 4 had typhoid fever before entering. We have, therefore, 35 left; of this number, 7 had undoubted fever in the hospital, and in 2 other cases the diagnosis was not absolutely certain. This makes it plain that 7 out of 35, or 20 per cent. of the house-staff, took fever—a larger number than took diphtheria, with which at one time they were constantly in contact, for of the 39 but 4 took that disease during the period in question. As for nurses, a large number have fallen victims too, though I have not been able to obtain satisfactory information on that point.

2. That not many nurses of experience have escaped contracting the disease at one time or another. The fact that the disease does not usually affect more than one member of a family at a time may be explained by the narrow limits of the age of susceptibility. In a household the fever is likely to pass over the parents and the young children, and attack those members of the family whose age is between twenty and thirty, whose number must necessarily be limited.

3. There are instances of the disease being communicated to patients in hospital suffering from the effects of accidents and from other diseases, as for example the following:

CASE I.—A Swedish sailor, aged twenty-six years, with a cavity in one lung, but no febrile symptoms, was in constant attendance upon the sick in the epidemic of 1887. He took the fever and went through its regular stages, convalescing in the fifth week. Rose rash was well marked.

This coincidence of typhoid fever and pulmonary phthisis as in the preceding case is rare.

CASE II.—A patient, aged sixteen years, who was completely bed-ridden, and whose case was diagnosed as acute anterior poliomyelitis, after being

[1] A paper read before the Medico-Chirurgical Society of Montreal, June 13, 1890.

some months in hospital contracted typhoid fever in a typical form.[1]

CASE III.—One of my fatal cases was that of a girl who was admitted to hospital for ulcer of the leg.

CASE IV.—A surgical patient in Dr. Shepherd's wards, who had been some months in hospital, contracted typhoid fever. There were cases of fever in the same ward.

Many other examples might be brought forward. These four came under my immediate notice.[2]

Now it might reasonably be asked, If typhoid fever is communicable, why do not more patients in general wards take the disease? and the answer is simple. Because (1) many are protected by age. We see in my 100 cases how the fever stops at the line of forty-five years, while many are younger than the average typhoid age. (2) Many have other diseases, tuberculosis, for instance, which is rarely met in conjunction with typhoid fever. (3) A certain number of cases may have been protected by previous attacks of fever, and a certain number may not be susceptible. (4) Fever is not as likely to spread in a hospital as it is in a private house, because the ventilation is better, the excreta are more carefully disinfected, and better appliances for counteracting infection are at hand.

Typhoid fever would be much more prevalent amongst hospital nurses, were it not for the fact that a certain proportion of them are protected by previous attacks, and that nearly all of them are over twenty-five years of age (the average of my hundred cases) when they begin nursing.

The Skin eruption.—Rose rash was noted in but 51 per cent. of the cases. This is a low figure, and I have no doubt that the rash was more frequently present, and escaped being noted. The rash was present in 11 of my 16 fatal cases, and in 40 of the 84 non-fatal cases. In 6 of the 11 fatal cases in which rash was present it was noted as being very copious. In one case where death resulted from the exhaustion of diarrhœa, the rash closely resembled the eruption of measles.[3] A delicate, uniform, scarlet rash was present in one case, that of a girl of twenty-five.[4] At first I was under the impression that antipyrine was the cause, but I find, on looking up the subject, that these scarlet rashes have been fully described by Jenner, Murchison, and others. Urticaria was present in 3 cases. In one it followed the administration of antipyrine. An outbreak of several pustules on the wrist and arms occurred in a fatal case. This was in 1885, when smallpox was epidemic, and the appearance of the pustules gave rise to much alarm. The autopsy showed that the case was one of true typhoid fever.

The tongue.—Of all the symptoms of typhoid fever the appearance of the tongue is one on which the utmost reliance can be placed, both for diagnostic and prognostic purposes.

Meteorism must be regarded as of the most serious import. It was present in 10 of the 16 fatal cases, and in one of them it seemed to be the direct cause of death, causing upward displacement of the thoracic viscera and direct embarrassment of the respiration.[1] Murchison noted meteorism in 20 out of 21 fatal cases, and Jenner observed it in 18 out of 19 fatal cases.

It was a surprise to me to find that abdominal distention was noted in but 4 of the 84 non-fatal cases. Probably my house-physicians have not thought it necessary to note mere slight fulness of the belly. All observers are agreed, however, that tympanites is a symptom of most serious import.

The treatment of this dangerous complication is most unsatisfactory. I have never been able to convince myself of the efficacy of the customary turpentine stupe, and internal medication has never yielded me satisfactory results. Charcoal, so constantly prescribed is, I believe, perfectly useless. Nor has the passage of a tube given as much relief as might reasonably be expected. Dr. Bell, in my case which was fatal from tympanites, dissuaded me from puncturing through the abdominal wall with an aspirating-needle, on the ground that when, in abdominal sections, the bowel is so punctured gas and fæcal matter escape through the openings for some time after the needle is withdrawn. Cases illustrating the soundness of this advice have been recorded by Curtis.[2]

Enlargement of the spleen.—Since the summer of 1887 I have paid special attention to the observation of this change. The spleen was found during life to be enlarged in 5 of the 16 fatal cases, but in only 7 of the 84 non-fatal cases. I was under the impression that it was clinically demonstrable in a larger proportion of cases. The fact is, that enlargement of the spleen is more often found by the pathologist than by the clinician, and is by no means constantly present. Small enlargements cannot be readily demonstrated, and even when the organ has attained a considerable size a distended abdomen may interfere with its being recognized.

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[1] See Montreal Medical Journal, vol. xviii. p. 445.

[2] This is not the experience of others. Liebermeister boldly makes the statement that physicians and nurses who take care of such patients are not more frequently attacked with the disease than are persons who have never seen such cases. "Up to 1865 I have never seen in the hospitals which I visited (Greifswald, Berlin, Tübingen) a single hospital patient, physician, or nurse, attacked with typhoid fever, although such cases are placed in the general wards."

[3] Montreal Medical Journal, vol. xviii. p. 444.

[4] Ibid., p. 205

[1] Ibid., vol. xviii. p.444.

[2] Annual of the Universal Medical Sciences, 1890.

Dr. Frederick C. Shattuck, of the Massachusetts General Hospital, in his paper on typhoid fever, which is based on an analysis of 129 cases, comes to a similar conclusion.[1]

Fagge, too, states that he believes the organ may be many ounces heavier than the normal without there being any appreciable percussion-dulness over it; and he has discovered that the spleen is not always found swollen after death, even in young subjects who have succumbed when the disease was at its highest.

Diarrhœa.—It would seem that diarrhœa is the exception, and constipation the rule. Diarrhœa was present in but 27 per cent. of all cases, and of these 27 cases 14 were fatal. Only two patients died without diarrhœa, one of pneumonia, and the other of the effects of a miscarriage.

Murchison notes diarrhœa in 93 per cent. of cases in England, M. Barth (quoted by Murchison) in 96 of 101 cases in France, and Shattuck found it in 51 per cent. in Boston. The difference between these figures is remarkable.

Diarrhœa always means danger, and I have become more and more disposed to regard a patient as safe so long as the bowels remain confined.

Intestinal hæmorrhage occurred in 2 of the 16 fatal cases, but in neither was it severe, nor did it appear to be the cause of death. On the contrary, in all the severe cases of hæmorrhage the patient recovered, so that the opinion expressed long ago by Graves to the effect that hæmorrhages were rather beneficial than otherwise seems not far from the truth. Trousseau was also of the opinion that this symptom was less dangerous than was commonly supposed.

Taking all cases together, severe hæmorrhages occurred in 9 patients. Louis reported hæmorrhages in 8 of 134 cases; Jenner in 7 of 21 fatal cases; Murchison found copious hæmorrhages in 3.77 per cent. of his cases; Shattuck found hæmorrhage in 5.4 per cent.

Our high percentage shows the general severity of the cases admitted. It is remarkable from what very severe hæmorrhages a typhoid fever patient can recover.

H. B., aged twenty-four years; admitted under my care on the sixth day of an attack of fever. History of intemperance. Usual fever-symptoms present. Previously to admission there had been a very severe attack of epistaxis. No abdominal pain or distention. On the ninth day there was retention of urine. On the fourteenth there was a sharp attack of diarrhœa, which soon ceased. On the fifteenth day there were severe tremors. Hæmorrhage was predicted, and turpentine and opium mixture[2] ordered to be given as soon as bleeding occurred. On the seventeenth day blood came in gushes from the bowel, and during the next twenty-four hours several pints must have come away. The patient's condition became very low, but he eventually made a good recovery in spite of the fact that on the thirty-sixth day an immense bedsore formed which exposed nearly the whole of the sacrum.

Headache and delirium.—Headache is nearly always present during the first half or the first third of the disease, and disappears spontaneously. Hence, I have very rarely had occasion to direct any special treatment against it, owing to the fact that the headache period has nearly gone by before the patient has arrived in hospital.

I have not been able to verify the statement of Broadbent, in Quain's *Dictionary of Medicine*, that severe and persistent headache is the forerunner of intestinal hæmorrhage.

Delirium generally means danger, yet it is not necessarily a very unfavorable symptom. Fierce delirium was present in several instances, notably in that of a Hungarian, whose case is already recorded,[1] and who was at first thought to be suffering from acute mania. Delirium was a prominent symptom in 8 of the 84 non-fatal cases, and in 7 of the 16 fatal cases, and in 2 of the latter it was very furious.

Duration.—The duration of a fever can only be estimated by the number of days spent in hospital, and this depends upon the season of the year, the climate, and the character of the hospital. The average duration of non-fatal cases was 40.8 days. The longest case lasted 80 days. The shortest stay in hospital was 7 days. This last patient had been ill for some days before admission, and came from a house where there were three other cases of fever.

Retention of urine occurred in 7 of the 84 non-fatal cases, and in 4 of the 16 fatal cases, or in 11 per cent. of all cases. Incontinence of urine and fæces was noted as being urgent and troublesome in but 2 cases, neither of which was fatal.

Epistaxis was not serious in any case.

Venous thrombosis occurred in but 2 cases, both non-fatal.

Relapse.—It was a surprise to me to find the history of but one relapse, for I was under the impression that relapses were of much more common occurrence. Experiences upon this differ within very wide limits, owing to a diversity of opinion as to what constitutes a relapse. Thus, Murchison recorded 80 relapses in 2591 cases in the London Fever Hospital, or in 3 per cent.; Griesinger (quoted

[1] Boston Medical and Surgical Journal, vol. cxxi., No. 10.

[2] Tannic acid, 10 grains; tinct. of opium, 10 minims; spirits of turpentine, 15 minims; mucilage, 2 drachms; compound tinct. of chloroform, 20 minims; peppermint water, 1 ounce, every two hours. This formula is borrowed from Murchison's work on the Continued Fevers.

[1] Montreal Medical Journal, vol. xviii. p. 444.

by Murchison) in 6 per cent.; Human in 8 per cent.; Maclagan in 10 per cent.[1]

I accept Dr. Murchison's definition of a relapse as being "a second evolution of the specific febrile process, after convalescence from the first attack is fairly established," and a relapse includes such symptoms as rise of temperature, rigors, chilliness, headache, pains in limbs, loss of appetite, furred tongue, nausea and often retching, diarrhœa, enlarged spleen, and a fresh eruption of rose spots. The number of relapses would be much increased were we to take into account those cases in which the relapse began before the original disease terminated. On this point my cases have not been examined.

Recrudescences, or what are commonly called relapses, were not frequent, owing, I believe, to the rule carried out that no change in the diet was to be made until the patient had shown a normal night temperature for a week.

Perforation was found at the autopsy of one patient, but in the Montreal General Hospital the occurrence is more frequent than my figures would indicate. Dr. Wyatt Johnston, the present pathologist, tells me that in 18 autopsies since 1886 he has found perforative peritonitis in 3, and Dr. Osler, who was his predecessor in the same office, found it 11 times in 53 autopsies. These figures are much higher than are elsewhere given. Autopsies are very difficult to obtain in cases of fever. The friends cannot understand why, if the doctors are satisfied that fever was the cause of death, they should wish for further examination.

Pregnancy.—The one pregnant woman with typhoid fever died. Murchison reports 10 recoveries in 14 cases, and in 2 of the 10 recoveries the patients carried the child through the fever.

Strümpell, in his *Practice of Medicine*, makes the observation that when abortion occurs in the course of typhoid a marked fall of temperature takes place. In my case the result was different; the temperature ran steadily up after abortion, reaching 108° in twenty-four hours, when the patient died.

Syncope.—In three non-fatal cases severe syncopal attacks occurred. I have seen sudden fatal syncope occur in convalescence from typhoid fever.

Complication with other diseases.—The following complications were noted—all in non-fatal cases: whooping-cough, old thickening of one pleura, diseased mitral valve with cardiac hypertrophy, periostitis of the superior maxillary bone, multiple abscesses, parotitis, and acute anterior poliomyelitis. One patient was a "jumper" from a lumber camp in Maine. He "jumped" consistently all through the fever and convalescence.

[1] Murchison on the Continued Fevers. Third edition, London, p. 552.

Pulmonary tuberculosis after typhoid fever.—I have never seen phthisis occur after typhoid fever, but upon several occasions I have made the mistake of regarding cases of tuberculosis as being typhoid fever.[1]

In connection with this, Fagge says that "it is a remarkable circumstance that, after searching the records of post-mortem examinations at Guy's Hospital, I have failed to find a single case in point."

Mortality.—The recorded mortality of my 100 cases represents neither remarkably good nor remarkably bad success. It must be remembered that the average age was twenty-four years. The London Fever Hospital has an aggregate mortality of 17.61 per cent., but a large number of the deaths occurred in the young. The mortality of Homerton Fever Hospital is 17.83 per cent., and that of Stockwell Fever Hospital 22.90. Shattuck's mortality in the Massachusetts General Hospital is but 8.37 in 129 cases, but it must be remembered that that hospital is not like ours, which is a city, marine, and immigrant hospital combined. A certain not insignificant proportion of cases were brought to the hospital practically moribund.

1	patient	died	on the	3d	day after admission.
1	"	"	"	5th	" "
3	patients	"	"	6th	" "
2	"	"	"	7th	" "
1	patient	"	"	9th	" "

Nearly all these had been transported from outlying villages.

I refuse to acknowledge the fairness of any comparison with figures taken from the experience of private practice. Medical men, unless they are most careful in noting cases, are apt to deceive themselves, and to think in a vague and uncertain way of their success or non-success, principally of the former. Private patients of the well-to-do classes have every possible point in their favor. They are not obliged to go on working as long as possible, and they are likely to meet with sensible treatment. Moreover, they have no transportation to undergo,—a very strong point in their favor. Only one-half of my fatal cases came from the city.

General treatment.—I have no faith whatever in the effect of medicines on the fever. Antiseptics are unpleasant to take, and in my opinion no more effective than so much water. To talk of disinfecting an abdomen full of typhoid excreta with small doses of carbolic or sulphurous acid seems to me as absurd as homœopathy.

Though all my patients have taken small doses of the mineral acids, I have prescribed these merely as a *placebo*, and I do not believe they have any action whatever.

[1] See Canadian Practitioner, June, 1888.

To purge at the outset, if constipation is present, is good practice, and I have frequently given 2 grains of calomel every two hours until the bowels moved. After that I follow Todd's advice, and when the bowels are fairly locked up I keep them so, merely ordering an injection every two or three days.

Diarrhœa itself seems to be dangerous, and no one can watch the course of many cases without being struck with the fact that it does not tend in any way to mitigate other symptoms whether abdominal or cerebral. Diarrhœa accompanies the worst cases of tympanites, and in hæmorrhagic cases it is often present.

Antipyretics.—Cold sponging was practised in all cases in which the temperature went above 102°. I have had no experience with the use of cold baths.

On the medicinal antipyretics I do not place any reliance. I remember well the days when no typhoid-fever patient could die without heavy doses of quinine. And where are they who now advocate quinine? A case in which temperature alone is killing the patient calls for antipyretics, but such cases are rare. Looking over my 16 fatal cases, I see that but 4 died with no other formidable symptom than high temperature. In Osler's 53 autopsies there were but 16 cases in which some such definite lesion as perforation, hæmorrhage, etc., was not present[1]—that is, but 16 cases on which antipyretics might have exerted a beneficial influence.

It would appear in some cases that, if we could overcome the hyperpyrexia, the patient would get well. Take, for example, the case of Matilda R.[2] This was a very severe case, and there were no symptoms beyond those which might have been attributed to the effects of heat. Now in this case there were found most extensive lesions in the bowel which were evidently keeping up the temperature. It seems to me that the use of antipyretics can have no better effect in typhoid fever than they would have in the fever of an internal abscess. In cases where other symptoms are bringing about the fatal result, symptoms such as extreme meteorism, exhausting diarrhœa, or severe brain symptoms, they are more than useless.

Some of the best recoveries from hyperpyrexia have taken place in cases in which no antipyretic was given. As, for example, the following case:[3]

A sailor who on the tenth day showed a temperature of 105.6° at 8 P. M., reaching 106° at 5.30 in the early morning of the twelfth day and dropping suddenly to 99° before 8 A. M.—a fact which shows the necessity of taking the temperature during the night as well in the morning and evening. The next rise, to 105.5°, took place in the afternoon of the same day, the temperature falling to 101.8° before 8 P. M. The highest point was reached, however, on the thirteenth day, when, at 2 A. M., it was 107°, but, as on the preceding day, a drop to 99° occurred, and the patient gradually recovered. This case occurred in 1884, and I have only to repeat what I said then, that I have lost faith in medicinal antipyretics.

We have come to regard confidently a morning fall and an evening rise as of regular occurrence —*e. g.*, in a private patient we have the temperature taken at 8 P. M., and if it be normal then we assume that it has been normal for the preceding twenty-four hours. This is a great mistake. If the temperature is taken hourly it will be found to vary greatly. In the case already described, as an instance of genuine relapse, the temperature was found very high when registered every four hours; being higher in the early part of the afternoon than in the evening, so that had we depended merely upon observations at 8 A. M. and 8 P. M. it would have entirely escaped our notice that hyperpyrexia was present. The truth is that remissions and exacerbations take place at any period in the twenty-four hours. "Generally the minimum temperatures occur between midnight and noon, and the maximum between noon and midnight."—*Colley.*

And in this way we deceive ourselves in the matter of antipyretics. For example, the case is running smoothly until we find that the temperature at 8 P. M. is too high; we accordingly give, say antipyrine, and then, and not until then, we begin making observations every four hours. Consequently it is just possible that our observation after 8 P. M. may show a fall which we hasten to ascribe to the effect of our medicine.

I have found antifebrin more satisfactory than antipyrine. It has been given in 3-grain doses every three hours.

[1] Canada Medical and Surgical Journal, vol. xiv.
[2] Montreal Medical Journal, vol. xviii. p. 203.
[3] Reported in full in the Canadian Practitioner.

CEPHALHÆMATOMA.

A Case of Sub-pericranial Blood-tumor in the Newborn Child.

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My desire in reporting a case of this interesting disease is not so much to place on record another example of a rare affection, but rather to call the attention of the profession to one of the most important, and as yet but rarely recognized diseases of very early childhood, as well as to prepare the way for a discussion of this subject at the meeting of the American Gynecological Society, to be held on September 16th of this year. Few men outside of the ranks of the pure specialists are aware that such a disease as cephalhæmatoma (cephalohæmatoma)

exists. Cases which occur in the practice of the general practitioner are diagnosed and treated by him upon "general principles."

The information which he possesses upon this subject is fairly comparable to that of a physician practising early in the last century.

A well-defined disease appearing soon after birth, running a brief, definite course, tending, as a rule, to resolution, but capable of seriously affecting the health, or even of implicating the life of the child, must be a matter of interest to every medical man; and the interest is heightened by the relative frequency of the disease (probably one in 250 obstetric cases), with the certainty that even a moderate obstetrical experience will sometime surely bring one or more cases under observation, and demand decision as to their nature and the course to be pursued.

Our curiosity is still further aroused, and our interest enhanced, when we learn that we have here also one of those curious examples of the tendency, felt even in scientific matters, of an important discovery to remain for a long time in the almost exclusive possession of its original promulgators, while, in the face of the clearest demonstrations and the most numerous writings, surrounding nations long seem to ignore its existence.

Thus the discovery of cephalhæmatoma dates from the close of the last century, when Dr. Michaelis, of Harburg, wrote in the second volume of *Loder's Journal*, "upon a peculiar kind of blood tumor,"[1] giving a full, clear account of the affection. This able article provoked within the succeeding thirty years a host of other writings, and abundant records of cases, in various German journals, and since that time cephalhæmatoma has been regularly registered among the more important diseases to which the newborn are liable.

In the following brief description of the disease, before illustrating my subject with the report of a case, I will make free use of the language of Michaelis.

Cephalhæmatoma (the name given to the disease by Naegele[2]) is a circumscribed effusion of blood between the periosteum and one of the flat cranial bones, appearing usually the day after birth, and gradually increasing in size until it forms a tense, prominent, rounded, or ovoid swelling. Its commonest seat is over one or both parietal bones. It is always lateral, never crossing a suture. The skin over the tumor remains movable and unaltered in appearance. The tumor is not painful, and does not decrease in size upon pressure. After two or three weeks, as a rule, it gradually disappears by absorption.

[1] "Ueber eine eigene art von Blutgeschwülsten."

[2] V. Zeller: De Cephalhæmatomate seu sanguineo cranii tumore recensnatorum. Heidelberg, 1822.

One of the most important diagnostic signs of the disease is the existence of a bony wall, one or two millimetres in height, which surrounds the whole outer circumference of the tumor. This can be distinctly felt through the skin, and gives at once the impression of a depressed fracture.

Injury usually has no apparent connection with the origin of this tumor, which often appears after natural, easy, and short labors, and upon a part of the head which was not prominent in the birth. Instead of being absorbed the collection of blood may undergo suppuration, perforating the cranial cavity, or rupturing externally.

The earlier observers frequently incised the tumor, cleaned out the blood, and put on a compress. The best treatment to-day is to wait for two or three weeks for resolution by absorption, and, if this should not take place, to incise and empty the sac under strict antiseptic precautions, and apply an antiseptic dressing. Whenever signs of suppuration arise the tumor should be freely opened at once, well washed out, and drained.

This, in brief, is the outline of the disease to which I desire to call attention by this preliminary note, in advance of a more formal, elaborate article upon the same subject, prepared for the meeting of the American Gynecological Society. The following case recently came under my observation:

I was called early one morning last June to attend Mrs. A., primipara, forty-one years old. She was of medium height, had a normal pelvis, and the uterus contained a living child.

She had had pains with great regularity during the preceding night, with the effect of bringing the head well into the pelvis, with the occiput to the left and anterior. The waters had already discharged through the os, which was dilated to about 2 centimetres. By noon the strong, regular pains had brought the head to within an inch of the floor of the pelvis—well flexed, and the flat bones extensively overlapping. At this point the head became firmly wedged. From 1.38 to 7.25 o'clock in the evening she had 106 pains, without bringing the head a half inch nearer the pelvic floor. The child was in good condition, but the mother seemed so exhausted that I then gave her benumbing doses of chloroform by inhalation, and applied Naegele's forceps. By assisting each pain I delivered her after an hour, with a slight tear, entirely within the vagina and in the left sulcus. The child was a female, weighing about 3000 grammes. At the outer angle of its right eye was a slight indentation in the skin from the pressure of the forceps, which disappeared in two days.

A large caput succedaneum covered the occipital region. No other deformity or evidence of injury was visible. On the second day I observed a reniform swelling over the most prominent portion of the right parietal bone, 6 cm. in length by 2.5 in breadth, lying entirely within the border of the

bone, which could be felt on all sides around the swelling. The concavity of its circumference looked downward toward the right ear, while its convexity was more or less parallel with the sagittal suture.

Showing the position of the cephalhæmatoma. Its relative size is greater than natural. The dotted triangles represent the bony plates which formed in the pericranium as the tumor disappeared.

At first slightly elevated, the tumor distended in two or three days, until it formed a prominent, rounded, tense sac. Its circumference did not appear to increase. Elasticity and fluctuation were distinct. There was no pulsation.

Pressure was painful only upon being prolonged when the child became restless. It did not reduce the size of the tumor. The scalp over the tumor was movable and unchanged in appearance. Surrounding the whole margin of the tumor a distinct sharp ridge could be felt, and within this craterous orifice palpation at first conveyed the sensation that the bone was wanting. Deeper palpation, however, touched the bony floor, removing the deception.

The tumor thus formed resembled in shape a potato cut in half lengthwise and laid flat on the head. It thus made a very conspicuous deformity, giving the head an extraordinary lop-sided appearance. The treatment was a policy of inactivity.

I did absolutely nothing to the tumor. In about ten days it began to diminish in size, and in three weeks and a half it had almost entirely disappeared. At this time there was still a slight elevation, and on pressure the fluid seemed to shoot under a parchment-like membrane. The borders felt rough, and from the upper margin two triangular plates projected over the denuded bone, apparently lying in the periosteum. Later no trace of the tumor could be detected.

THE TOXIC PRODUCTS OF THE BACILLUS OF HOG-CHOLERA.

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THE fundamental researches of Löffler, Schütz, Lydtin, and Schottelius, in Europe, and of Salmon and Smith, in America, have demonstrated the existence among swine of at least three distinct infectious diseases. These are:

1. Hog-erysipelas, or *rouget* of France, and *schweinerothlauf* of Germany.
2. Swine-plague, or *schweineseuche.*
3. Hog-cholera, or *schweinepest.*

The first of these, hog-erysipelas, is exclusively a European disease, and has not, so far as known, been observed in this country. In the course of this disease only general symptoms of infection, as in anthrax or septicæmia, are manifested. The most important anatomical changes are as follows: The spleen is markedly swollen and dark-colored; the mucous membrane of the stomach and intestines is inflamed and infiltrated with blood; a parenchymatous inflammation of the liver, heart, and muscles is present, as well as some reddening of the skin.

The second disease, swine-plague, appears to be common to both continents. It may be characterized as an inflammation of the lungs and skin, accompanied with death of the lung tissue and slight symptoms of infection. When the disease becomes chronic, a caseous condition of the lungs results which may excite a similar condition in the lymphatic glands and the joints.

The third, hog-cholera, is preëminently a disease of the digestive tract, and the large intestine is especially involved. It is the great swine-disease of this country, and is very probably present in England associated with other forms of disease under the name of swine-fever. On the European Continent this disease was unknown until 1887, when it suddenly appeared in France, Sweden, and Denmark.

Apart from this sudden visitation of hog-cholera in the above-mentioned countries of Europe, it may be said that on the Continent there are two prevalent diseases—hog-erysipelas and swine-plague. In this country the former is entirely absent, and appears to be replaced by hog-cholera, so that the two swine-diseases in America are hog-cholera and swine-plague.

A very careful bacteriological study of these three diseases has shown their microbic origin. The researches of Löffler demonstrated the etiological importance of the bacillus of hog-erysipelas; those of Schütz accomplished the same with reference to the bacillus of swine-plague; and lastly, Salmon and Smith have demonstrated that hog-cholera owes its origin to a specific bacillus.

But even when the causal relation of a germ to a disease has been shown, it does not follow that all the problems connected with the production of the disease have been settled. Rather the reverse. The first question that then arises is: "How does the germ produce the disease?" To answer this question briefly, without taking up discarded theories of only historical importance, consider the growth of the simple yeast-cell, an organism closely related to the bacteria proper. The saccharine solution in which the yeast-cell is grown may produce, when

ingested, marked toxic symptoms—*i. e.*, intoxication. The effects are not due, as is well known, to the yeast-plant directly, but to the chemical products formed by its growth—in this case, to the alcohol. And such is the explanation of the manner in which bacteria produce disease. In the body, whether of man or animal, these small disease-producing micro-organisms find all the material necessary to their growth and multiplication. Like all living beings, they consume material which enables them to grow and multiply, and at the same time they secrete or give off products of cell-metabolism which may or may not be injurious—*i. e.*, toxic. Analytic as well as synthetic changes are constantly carried on during the lifetime of the simple bacterial cell, corresponding thus in every respect to the more highly organized members of the vegetable and animal kingdoms.

Among the products resulting from the growth of these microörganisms none have received more attention up to the present day than those which are known under the generic name of ptomaïnes. The word ptomaïne, first applied by Selmi to designate the basic or alkaloidal compounds which he found in decomposing cadavers, has been enlarged in its significance so as to embrace all basic products formed by bacteria in general. We, therefore, may have ptomaïnes produced by the activity not only of disease-producing bacteria, but also by the engenderers of putrefaction. With respect to their physiological action, it is customary to speak of toxic and non-toxic ptomaïnes. Quite recently, however, Brieger, of Berlin, who has done more than anyone else to bring light into this heretofore obscure field of knowledge, has proposed to restrict the word ptomaïne to only the non-poisonous basic products generated by the activity of bacteria, and to designate the poisonous basic bacterial products by a corresponding generic term, *toxine*. It is unnecessary at this point to consider the merits or faults of this classification, and beyond the mere statement of the fact it will receive no further attention. The term ptomaïne has at present such a well-accepted significance that it seems undesirable to restrict its meaning, and for that reason it is retained in this paper in its original sense.

In the light of very recent investigations, however, it seems that the noxious functions of bacteria can be manifested in the production of toxic bodies other than ptomaïnes. The latter may be considered as the final products of the action of bacteria on the proteid molecule; but intermediate between the complex harmless proteid and simple but toxic ptomaïne we may have one or more cleavage-products closely related to and apparently undistinguishable from the parent proteid molecule, except in physiological action. These new poisonous products generated by bacteria have been designated as *toxalbumins* by Brieger and Fränkel.

A brief *résumé* of the work of these two investigators will not be out of place at this point. Its great importance from a chemical standpoint, and the influence that it will undoubtedly exercise in the future, bringing forth as it does a great, if not the greatest, etiological factor in microbic diseases, will be readily recognized.

In studying the poisonous products generated by the growth of Löffler's diphtheria bacillus, Brieger and Fränkel found that the culture, liquid-freed from its bacteria by filtration, possessed a high degree of toxicity, which was partially lost when the liquid was kept at 60° C. for a short time, and completely destroyed by an exposure of ten minutes to a temperature of 100°. It could, however, be evaporated at 50°, or less, even when acidulated with hydrochloric acid. This showed that the poisonous substance was readily decomposed by a temperature exceeding 60°. A careful examination for basic products yielded absolutely negative results. The poisonous principle was found to be insoluble in absolute alcohol, but soluble in water, and thus could be obtained in a condition of purity. Its reaction showed it to be related to the serum-albumins, while chemical analysis indicated relationship with the albumoses or peptones. Even in very small quantities it causes in rabbits fatal results, which may not supervene until after an extraordinarily long time—weeks, and even a month.

From cultures of the same bacillus, after it had lost its virulence, a similar proteid body was obtained, which, however, was wholly inactive. Cultures of the bacillus of typhoid fever, of the bacillus of cholera, and of the staphylococcus pyogenes aureus yielded toxic globulin-like bodies; whereas, those of the tetanus and anthrax bacilli give toxic albumin-like bodies, resembling that obtained from diphtheria cultures.

Independently of Brieger and Fränkel, and at about the same time, Baginski and Stadthagen found that cultures of a common saprogenic intestinal bacillus, similar to, if not identical with Finkler-Prior's bacillus, produced, in addition to a moderately poisonous base, a toxic proteid substance related to the peptones.

The existence of poisonous proteid bodies formed by the growth of microörganisms, was shown by Christmas and by Hankin, some time previously to the investigations just referred to. From cultures of the staphylococcus pyogenes aureus, Christmas (1888) isolated a proteid substance which, when introduced into the anterior chamber of the eye, or into the subcutaneous tissue, produced suppuration. Hankin, in 1889, obtained immunity in mice and guinea-pigs against anthrax by first inoculating the

animals with an albumose-like body, which he obtained from cultures of the anthrax bacillus.

In the following pages the results obtained from a study of Salmon's bacillus of hog-cholera will be given. The work at first was made to cover a search for the ptomaïnes generated by this microörganism, but subsequently has included an examination for toxalbumins. The methods pursued in this investigation were in general an adaptation of the methods of Brieger. The culture of the microörganism employed was obtained from the Agricultural Department at Washington, and before use was passed through a number of rabbits in order to secure maximum virulence.

Methods and results of analysis.—As a culture-medium pork broth was employed, and was prepared as follows: The finely-hashed pork was treated with distilled water, in the proportion of one litre of water to 500 grammes of meat. The mixture was then placed in tin pails, and heated in a steam sterilizer two hours daily for several successive days, in order to remove the excess of fat. This done, the material was poured into a number of half-litre and litre flasks, which had been previously cleaned, closed with a tight-fitting plug of cotton, and efficiently sterilized by heating for two or three hours at about 175°. The flasks, thus equipped, were sterilized in a Koch's steam-sterilizing apparatus by heating, two hours each day, for three consecutive days. When cool the contents were inoculated with the above-mentioned virulent culture of the hog-cholera bacillus, and the flasks then set aside in incubators, at a temperature of 35–37° C., where they remained nearly eight weeks.

At the expiration of that time the flasks were taken out and the contents subjected to examination. They were found to possess a strong alkaline reaction and an amine odor. A portion when heated on a water-bath gave off alkaline vapors, and the odor was more marked. Only those flasks were reserved for further study which were found to contain pure cultures of the hog-cholera bacillus.

Several preliminary examinations were made to ascertain the presence or absence of phenol, indol, and related bodies. For this purpose about 100 c. c. of the clear culture-liquid were acidulated with sulphuric acid, a marked effervescence resulting, and then subjected to distillation. A number of such distillations were made, but at no time was any reaction obtained on addition to the distillate of bromine water, or of hydrochloric or nitric acid, showing the entire absence of phenol, skatol, and indol.

The remaining contents of the flasks were then acidulated with hydrochloric acid and filtered through muslin. The filtrate, amounting to about six and a half litres, was neutralized with sodium carbonate solution, and evaporated on a water-bath. The residue of meat-fibre was extracted with about three and a half litres of five-per-cent. hydrochloric acid solution, filtered, and the filtrate evaporated separately, taking care, as before, to keep the liquid neutral.

In both cases thick, syrupy residues were obtained, which were taken up with successive portions of absolute alcohol, the extraction being markedly facilitated by the use of a pestle, whereby the material was reduced to a fine granular condition. The alcoholic solutions thus obtained were then combined and filtered, and the clear solution was precipitated with an alcoholic solution of mercuric chloride. An abundant, white, amorphous precipitate was obtained. This was filtered off, washed with absolute alcohol, then suspended in distilled water, and decomposed by a current of hydrogen sulphide. After removing the sulphide of mercury by filtration the filtrate was concentrated, taking care to keep the liquid near the neutral point, and finally again treated with hydrogen sulphide to remove the last traces of mercury.

The filtrate, now perfectly free from mercury, was neutralized and evaporated to dryness on a water-bath. A yellowish-brown syrup, containing some needle-shaped crystals and some crystals of salt, was obtained. This was taken up in 100 c. c. of distilled water, neutralized, and small quantities were injected into rats. One-fourth c. c. produced death in a very short time, preceded by spasmodic contraction of the limbs. The animal died on its side, with the feet extended. One-eighth c. c. produced marked excitement at first, but subsequently the animal assumed a fixed position, and the eyes were half-closed by a thick secretion. It was found dead thirty-six hours later, lying on its side, with the feet extended. Post-mortem examination showed bright-red lungs; heart in diastole; liver dotted with minute hæmorrhagic spots; spleen very light in color; kidneys mottled with superficial necrotic spots; and intestines reddened along the entire length, and with swollen, inflated patches.

These experiments demonstrated that a substance of marked toxic properties was present in the residue from the mercuric chloride precipitate. The solution was again evaporated to dryness on a water-bath, and the residue again extracted with a considerable amount of absolute alcohol. The alcoholic solution was in turn precipitated with alcoholic platinic chloride. A rather large flesh-colored precipitate was obtained, which was transferred to a filter and washed well with absolute alcohol.

The filtrate from the platinic chloride precipitate was diluted with water, and decomposed with hydrogen sulphide, and the filtrate thus obtained gave a

small quantity of a sticky syrup, apparently identical with the syrupy salt obtained from the platinum precipitate. It may be mentioned at this point that the mercuric chloride filtrate was decomposed in like manner. It gave a considerable amount of ammonia, but otherwise no toxic substance was present.

The platinum chloride precipitate was then treated with cold distilled water, which readily dissolved all but a very small portion. The solution was filtered off, and the filtrate on standing gave a yellow deposit of a platinum compound, which under the microscope appeared perfectly homogeneous, and in the form of clear, yellow, oil-like globules. This deposit was filtered off, well washed with water, then dried at 75°C. The filtrate, on standing forty-eight hours, gave a second deposit, which was likewise removed by filtration, washed and dried as before. This deposit was subjected to elementary analysis, and the results obtained were tabulated (Table I.). The

TABLE I.

	Per cent. found.		Average.	Calculated per cent. for $C_8H_{14}N_4PtO_8$.
	I.	II.		
C =	20.19	19.49	19 84	19.66
H =	2.66	3.14	2.90	2.87
N =	11.65	.....	11.65	11.47
Pt =	39.64	39.90	39.77	39.80
O =	.....	.....	.....	26.20

addition of alcohol to the solution of the platinum precipitate, after removal of the last deposit, gave a light-yellow granular precipitate, which was found to consist almost entirely of the same compound as before. The alcoholic filtrate from the original platinum chloride precipitate, on standing some days, likewise gave a deposit of the same characteristic bright-yellow oil-like globules, which were likewise separated by filtration, well washed with water, then dried at 75°, and analyzed. The substance was not found to contain chlorine or sulphur. The results obtained are given in Table II.

In the dry condition this compound, which, perhaps, is closely related to creatin, forms a dull-yellow powder. When completely dry, it is insoluble in hot and in cold water; soluble in acids and alkalies, from which solutions it gives precipitates with barium chloride and silver nitrate. Owing to the small quantity at my disposal it was not possible to free the substance from platinum.

The dilute alcoholic filtrate from which the preceding compound was obtained was found to contain a platinum salt, crystallizing in long needles. In order to isolate this substance the filtrate was diluted with water, and the platinum removed by hydrogen sulphide. The filtrate from the platinum precipitate was concentrated on a water-bath, taking care to keep the solution near the neutral point. The small amount of platinum which was still in solution, and had not been precipitated before owing to the presence of free acid, was now entirely removed, and the neutralized solution free from platinum was evaporated to dryness, or, rather, to a thick, dark-yellow syrup. The residue was taken up in distilled water, and decolored as much as possible with animal charcoal. The light-yellow solution thus obtained was again evaporated to dryness, and, in order to remove the salt, the residue was extracted with cold absolute alcohol, in which the syrupy portion was found to dissolve quite readily. The alcoholic solution in turn was evaporated to dryness, the light-yellow syrup again taken up with cold absolute alcohol, and this operation repeated until all the salt was removed.

In this manner a light-yellow syrup was finally obtained, which showed no tendency to crystallize, even when kept for a week at a temperature of 37°. It was soluble in water and alcohol, and proved to be the hydrochloride of a new base. In order to prepare it in a form suitable for analysis it was taken up in cold absolute alcohol, and the clear solution precipitated by an alcoholic solution of platinum chloride. The finely granular, light flesh-colored precipitate thus obtained was thoroughly washed with alcohol, dissolved in a small quantity of water, filtered, and from the filtrate the platinum salt was again precipitated by the addition of absolute alcohol. This precipitate was transferred to a filter, well washed with alcohol, and finally dried at 75°. On elementary analysis it gave the following percentage composition: C=20.40, H=4.67, N=4.99. These figures agree very closely with the calculated percentages in the formula $C_{10}H_{26}N_2.2HCl.PtCl_4$, in which C=20.57, H=4.79, N=4.79. The per cent. of platinum in the substance, however, varied in the several determinations, and from the theoretical value, so that it will be necessary to re-determine the composition of this new base as soon as new material is obtained.

The free base appears, therefore, to be a diamine, and future examination will prove whether it posseses the formula $C_{10}H_{26}N_2$. It exhibits marked, though not very strong, toxic properties, as will be seen from the experiments to be described. Moreover, it appears to be the only basic compound present which possesses such properties. On this account it is named, temporarily, *susotoxine*, from the Latin *sus*, a hog. The quantity obtained did not suffice for the isolation and study of the free base, and such examinations as were made were, therefore, confined to the hydrochloride.

The hydrochloride was obtained by decomposition of the platinum salt as a light-yellow, perfectly clear syrup, which showed no tendency to crystallize or harden, either on standing at the ordinary temperature or when kept for a week in the incubator at 35°. It is somewhat hygroscopic, and is readily

soluble in water, as well as in cold absolute alcohol. When heated with a fixed alkali it gives off a strong amine odor, such as is perceived on evaporating the original culture fluid, if it happens to be alkaline in reaction. The following table gives a synopsis of its reactions with reference to the common alkaloidal and other reagents:

TABLE II.

	Alcoholic solution.	Aqueous solution.
Alc. $HgCl_2$	Heavy, white precipitate, soluble in water.	Slight cloudiness.
Alc. $PtCl_4$	Whitish precipitate, soluble in water.	Addition of alcohol produces precipitate.
Alc. $AuCl_3$	Slight cloudiness.	" " " "
Alc. picric acid . .		
Phosphotungstic acid	Heavy, white precipitate.	Heavy, white precipitate, soluble in NH_4OH.
Phosphomolybdic acid	Heavy, yellowish precipitate.	Heavy, yellowish precipitate, soluble in NH_4OH, producing faint blue color.
Sodium tungstate . .	Flocculent precipitate.	" " " "
$I + KI$	Addition of water produces precipitate.	Dirty-brown precipitate.
Bromine water . .	Addition of water produces precipitate.	Abundant yellow precipitate.
NH_4OH		" " " "
$(NH_4)_2CO_3$		" " " "
NH_4CyS	.....	Slight cloudiness.
KOH	Amine odor on heating.	Volatile amine on heating.
Fe_2Cl_6		" " " "
$AgNO_3 + NH_4OH$.		" " " "
Tannic acid . . .	.....	Heavy, flocculent, yellowish-white precipitate.
Lead acetate . . .		" " " "
Copper acetate . .		" " " "

The platinochloride is obtained by precipitation as a light, flesh-colored, granular precipitate. It is readily soluble in water, from which it can be reprecipitated by addition of absolute alcohol. From aqueous solution, when allowed to evaporate slowly, it crystallizes in long, thick needles.

The mercurochloride is thrown down from solutions of the hydrochloride in absolute alcohol, by alcoholic mercuric chloride, as a heavy, white, granular precipitate. This readily dissolves on the addition of a small quantity of water, and can be perfectly reprecipitated by addition of absolute alcohol. On treatment with hydrogen sulphide it is readily decomposed, yielding the pure hydrochloride.

The aurochloride is very soluble in water and alcohol. From the alcoholic solution it may be partially precipitated by ether as a light-yellow, oily precipitate, which is adherent to the sides and bottom of the tube.

Physiological experiments.—By a series of preliminary experiments made with sterilized culture-fluid on animals, it was shown that a relatively large amount was necessary to cause fatal results in rats. Thus, 50 c. c. of the culture-fluid of the hog-cholera bacillus were sterilized by heating one hour at 60°, then acidulated with hydrochloric acid, and concentrated at a low temperature on a water-bath to 6 c. c. Of this, 3 c. c., representing 25 c. c. of the original culture-fluid, were neutralized and injected subcutaneously into a young white rat. At first the animal was quite uneasy and jumped about, and the respiration became rapid; but it soon became quiet, the head most of the time resting, and the eyes closed. In about half an hour the gait became staggering, and a sleepy condition, with unwillingness to move, prevailed. About four hours later the animal became comatose, lying with the head horizontal, the respirations were slow and deep, and it finally died in this position. Post-mortem examination showed some bloody infiltration under the skin; a jelly-like mass at the seat of inoculation; the heart in diastole; lungs bright-red; some exudate in the pleural cavity; liver soft, but otherwise normal in color and size; kidneys and spleen normal.

The general course of the symptoms thus observed corresponded exactly to those obtained by inoculating rats with unsterilized cultures, except that in the latter case, where the disease lasted several days, a thick secretion formed between the eyelids and the animal passed abundant soft fæces.

In another experiment the clear culture-fluid, after being sterilized by heating to 60° for one hour, was evaporated on a water-bath, without neutralization with an acid, to dryness. The residue was taken up in a little water, and a portion of this solution, corresponding to 15 c. c. of the original culture-fluid, was injected subcutaneously into a young rat. The animal remained in a perfectly quiet condition for some hours, with, perhaps, slightly increased respiration. Its hind legs soon appeared to be affected, for the animal sat upright with difficulty, and showed a tendency to topple over; the eyes were closed; ears pale. About four hours later it recovered somewhat, and was able to crawl about, though it had but partial control over its hind legs. Eight hours after the inoculation the animal seemed to have recovered, but the next morning was found in a very depressed condition, lying perfectly quiet, with the eyelids closed, and conjunctivæ filled with a thick secretion. It remained in this condition during the entire morning, but about 1 P. M. toppled over on its side, and was unable to rise, though kicking vigorously. Finally, after some time, it regained an upright position, remained thus all the afternoon, and died during the evening. The post-mortem examination corresponded to that described above.

This experiment showed that the sterilized culture-fluid retained its toxicity, when evaporated, without neutralization, to dryness. When smaller quantities of the liquid were employed for injection the animals survived. The equivalent of at least 15 c. c. had to be injected in order to produce fatal results.

To test the physiological action of the syrupy hydrochloride, the following experiments were made: About 100 mg., dissolved in a little water, were injected subcutaneously into a young rat. The animal was at first quiet, apparently unwilling to move. After some ineffectual attempts at jumping it settled down in a recumbent position, and when placed on its side was unable to rise. Respiration was at first retarded, later increased, but toward the end was again very slow. Convulsive tremors shook the body at frequent intervals. The animal kicked vigorously. Reflexes were present almost to the end. As death approached, the red eyes whitened and took on a glazed, opaque appearance. Death resulted in one and a half hours. The animal was on its side, the feet extended. Post-mortem examination showed the heart arrested in diastole, lungs rather pale, stomach contracted, serum in thoracic cavity, subcuta pale and œdematous.

A second animal was given half of the preceding dose. It appeared very much affected in the course of the following hour, moving with difficulty; the next morning it was found with eyes closed, in a sleepy condition, and very unwilling to move. Forty-eight hours later this animal was given a second dose, the same in quantity as the first. This injection was borne without any apparent manifestation. Accordingly, the idea to make a third inoculation suggested itself, this time with the virulent pure culture of the bacillus, in order to see what degree of immunity, if any, had been secured. The animal was, therefore, inoculated subcutaneously with 1.5 c. c. of the bouillon-culture of the bacillus. As a control, two animals, from the same litter as the preceding, were selected, and were given by injection 1 and 2 c. c. of the same culture, respectively. Both controls died the next day, whereas the test-animal did not show any signs of indisposition for more than twenty-four hours after the death of the controls. On the third day a moist secretion appeared about the eyes, and the animal became unwilling to move, but ate well. This condition continued during the fourth day, and the animal finally died on the morning of the fifth day, more than three days after the death of the control-animals.

This experiment would, indeed, seem to indicate that a partial immunity had been conferred upon the animal by the injection of a pure ptomaïne. It would have been very desirable to repeat it upon a series of animals; but, unfortunately, the material was not abundant, and it was thought best to reserve the remainder for purpose of analysis. Whatever may be the significance of this last experiment, it is evident that the new base is decidedly toxic in action.

Toxalbumins of hog-choiera.—The researches of Brieger and Fränkel, Baginski, Stadthagen, Hankin, and Christmas, already referred to, suggested the desirability of examining cultures of the hog-cholera bacillus, with reference to the presence or absence of these new toxic substances.

For this purpose some pork-bouillon which had been inoculated with the bacillus of hog-cholera, was kept at 35-37° for a period of five and a half weeks. About 600 c. c. of the clear, filtered liquid were concentrated in vacuo at 36° to less than one-fourth its volume. The concentrated aqueous solution thus obtained was added, drop by drop, with constant stirring, to six or eight times its volume of absolute alcohol. The flocculent precipitate which formed was allowed to subside, then received upon a filter, and well washed with absolute alcohol. The filter was then spread open, and allowed to dry at the temperature of the room. There was thus obtained a light, dry, whitish, crumbling powder, which is readily soluble in water, yielding a slightly opalescent solution.

To test its action upon the lower animals, 100, 50, and 25 mg., respectively, were injected into three young rats, from one litter. The animal which received 100 mg. shortly afterward began to crawl vigorously around the side of the cage, on its belly, unable to rise. The eyes were soon flooded with a thick secretion, and its toes became red. Finally, it became quiet, lying on its belly, with the feet extended. The respiration became deeper, and a coma-like condition set in. The animal died, without struggles or convulsions, in about three hours. The animal which received 50 mg. went through the same course of symptoms, though to a less degree. It died under exactly the same conditions four hours after the injection. The animal that received 25 mg. became very sick, but finally recovered. The eyes were covered with a thick secretion, the toes were red, and the animal showed no disposition to eat or move. It passed a large quantity of soft fæces. This condition lasted about two days, and on the third it disappeared.

As a control to the preceding experiments, as well as to test the virulence of the liquid which had been concentrated in vacuo, a young rat, belonging to the same litter as the preceding, was given 3 c. c. of the concentrated liquid. The animal passed through exactly the same symptoms as those observed in the rat which had been given 25 mg., and finally died two days later.

One week later the rat which survived the injection of 25 mg. was given a second dose of 30 mg.,

with scarcely any effect following. Inasmuch as this indicated the establishment of a tolerance for the poison, it was decided to continue the injections at intervals with successively increasing quantities, and then, if the animal survived the maximum dose of the poison, to inoculate finally with a culture of the virulent germ, and thus obtain immunity to the disease. This expectation was realized. The animal was given, subcutaneously, at intervals of five, three, five, two, and four days, respectively, 40, 50, 75, 100, and 125 mg., without any effects. Control-animals inoculated with 100 and 125 mg. invariably died in from three to six hours. Three days after the last injection of 125 mg. the experimental animal was inoculated with 1 c. c. of a bouillon-culture of the highly-virulent germ. Only a slight temporary effect was observed during the first day, after which the animal recovered its former activity and appetite, and has remained in good condition ever since. A control-animal, which was given the same quantity of the same culture, sickened on the next day, refused to eat or drink, rested most of the time in a perfectly motionless condition, and finally died one week later.

From this experiment it will be seen that complete immunity can be produced in rats against the action of the bacillus of hog-cholera by previously introducing into the animal successively increasing doses of the toxalbumin generated by this microörganism.

A further study of this interesting toxic proteid is now being made, and the results obtained will be published in due time. It may be stated now, however, that the toxic properties of the substance are not destroyed when the dry powder is heated for one hour at 72°, but are effectually destroyed by heating for the same length of time at 100°.

To summarize the results which have been obtained from the study of the chemical products of the bacillus of hog-cholera, we may say that when grown in proper nutrient material it forms:

1st. A basic toxic substance, or ptomaine—*susotoxine*.

2d. A toxic proteid substance, or toxalbumin.

3d. That this toxalbumin is capable of producing immunity in rats against the action of virulent bacillus.

In conclusion, I desire to express my thanks to my friend Mr. Charles J. Greenstreet, who kindly executed the elementary analysis in this work.

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A PRELIMINARY STUDY OF THE PTOMAINES FROM THE CULTURE-LIQUIDS OF THE HOG-CHOLERA GERM.[1]

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DRS. SALMON and SMITH, of the Bureau of Animal Industry, U. S. Department of Agriculture, were the first to demonstrate that the substances produced by bacteria in their growth in culture-media could be used for purposes of preventive inoculation. This they proved by a number of experiments upon pigeons, in 1887. They succeeded in producing immunity from hog-cholera by inoculating pigeons with sterilized culture-liquids of the hog-cholera germ. With a view to learn more of the products of these and other disease-germs, a chemical laboratory was recently attached to the Bureau of Animal Industry, and for a short time I have been engaged in studying the products in the culture-liquids of the hog-cholera germ. The bacteriological work was done by Dr. Moore, of the Bureau of Animal Industry. The advice of Drs. Salmon and Smith has also been very valuable, and it was at their suggestion that the work was undertaken. Although the experiments are not complete, we think it best to make now a preliminary statement in regard to some of the results obtained, reserving for the near future a more extended account of the work.

The researches of Brieger, Baginsky, Salkowski, Selmi, and others, have shown that the multiplication of a number of different bacilli produces basic substances of an alkaloidal character, called *Ptomaïnes*. Some of these bodies are very poisonous, and a number of them have been shown to be

[1] Read before the Chemical Section of the American Association for the Advancement of Science, August, 1890.

identical with certain of the artificially prepared amines. In general, the best results have been obtained by allowing the germs to multiply in beef-bouillon, and after a number of experiments we have found an acid bouillon containing 2 per cent. of peptone to be the most satisfactory medium for the growth of the hog-cholera germ. Erlenmeyer flasks of 500 c. c. capacity were used, the mouths of the sterilized flasks being closed with a cotton plug. After inoculating the liquid with the germ the flasks were allowed to stand in the incubator for from two to three weeks, at a temperature of about 37° C. At the end of this time the liquid had become cloudy, and considerable precipitate, due to the growth of the germ, was found at the bottom of the flask and in suspension. The fluid had a decidedly alkaline reaction. Careful examination showed that the culture-liquid had not become contaminated with foreign germs.

In endeavoring to isolate the chemical products from these liquids, the methods, with some slight modifications, by which Brieger obtained such brilliant results, were followed.

The culture-liquid, after being acidified with dilute HCl, was evaporated on the water-bath. The residue was then extracted with 98-per-cent. alcohol, and the filtered solution treated with mercuric chloride. A heavy crystalline precipitate was formed which increased upon standing. After filtration this precipitate was treated with water, and decomposed with sulphuretted hydrogen, and the mercury sulphide removed by filtration. From the filtrate, after removal of the excess of H_2S and concentration, I was able to isolate cadaverine, and a primary amine which I have not yet identified. The filtrate from the mercuric chloride precipitate was freed from excess of mercury by sulphuretted hydrogen, and the mercury sulphide filtered off. The residue, after concentrating this filtrate, was extracted with absolute alcohol, the solution thus obtained showing the presence of a salt of an alkaloidal character. The reactions were as follows:

With phosphomolybdic acid—light-yellow precipitate.

With bismuth-potassium iodide—red needles.

With phosphotungstic acid—a white precipitate.

With potassium iodide and iodine—brown-red precipitate.

With platinum chloride—yellow crystalline precipitate.

With gold chloride—yellow-red crystalline precipitate.

The double salt obtained with $PtCl_4$ was submitted, after crystallization from 96-per-cent. alcohol, to a preliminary analysis, giving results which correspond to the formula $C_{14}H_{34}N_2PtCl_6$.

The free base I have not yet succeeded in obtaining in a pure form, and will not be ready to give this ptomaïne a name until more is learned of its constitution. The hydrochloride of this base is soluble in absolute alcohol, but I have obtained the salt only as a thick syrup, which so far will not crystallize over sulphuric acid in vacuo.

By treating the original culture-liquids of the hog-cholera germ with a large excess of absolute alcohol a white flocculent precipitate was obtained, a portion of which was soluble in water, and could again be precipitated by alcohol. By repeated treatment in this manner with water and alcohol a small quantity of an albuminoid body containing C, H, N, O, and S was finally obtained. This substance, which we will call albumose, when dried over sulphuric acid in vacuo, crystallized in white translucent plates. After drying, it was still soluble in water, though it dissolved with more difficulty. The water solution gave with $PtCl_4$ an almost insoluble precipitate, appearing under the microscope as needle-like crystals.

The toxic effects of this albuminoid body and of the ptomaïne were tested by subcutaneous inoculation of guinea-pigs. At the point of the inoculation with the albumose there was swelling and the formation of a hard lump, which disappeared after four or five days. There was also a rise in the temperature of the animal for a few days, but in other respects it seemed to suffer no inconvenience.

After subcutaneous injection of a small quantity (½ c. c. or about 0.005 gramme) of the neutral solution of the hydrochloride of the new base before referred to, a rise of temperature in the animals was noted for a few days, and also necrosis and slight ulceration at the point of inoculation, otherwise the animals appeared well. The salt of this base, as well as the albumose, are, therefore, not virulent poisons. It may be added that special attention was given to keeping the solutions sterile, by means of a Pasteur filter, and that the absence of germs was determined by making plate-cultures.

According to an article in the *Berliner klinische Wochenschrift*, March, 1890, Brieger and Fränkel have succeeded in isolating from culture-liquids (containing 10 per cent. of blood-serum) of the diphtheria, typhoid fever, and cholera-infantum germs, albuminoid bodies which they call tox-albumose, and which are very poisonous in small doses.

From culture-liquids of beef infusion with peptone and 2 per cent. of blood-serum, we have also obtained with the hog-cholera germ an albumose, having chemical properties similar to those described by Brieger, but not virulently poisonous to guinea-pigs when given subcutaneously, though there was considerable ulceration at the point of inoculation.

The detailed results of the experiments in pre-

ventive inoculation which have been conducted are not quite ready for publication. The statement may be made in advance, however, that by inoculating guinea-pigs with certain chemical compounds which I have prepared, the animals have been rendered immune from hog-cholera.

Having, therefore, made considerable progress in the study of the culture-liquids of this hog-cholera germ, and also in preventive inoculation with chemical compounds, the results of this line of work are reserved for the present, and until more detailed results of the experiments can be given, which are promised for the near future.

COCAINE AND ANTIPYRINE COMBINED IN THE TREATMENT OF OBSTINATE VOMITING, AND AS A LOCAL ANÆSTHETIC FOR MINOR SURGICAL OPERATIONS.

BY E. STUVER, M.S., M.D.,
OF RAWLINS, WYOMING.

SEVERAL years ago, while treating a case of fever complicated by obstinate vomiting, the stomach rejecting everything taken into it, even small quantities of iced water, I first resorted to the use of cocaine muriate for the relief of this condition. One-eighth grain of the drug, in aqueous solution, administered about twenty minutes, or long enough to obtain its anæsthetic effect, before giving food or medicines, entirely relieved the vomiting, which did not recur during the illness. Since that time I have used cocaine in quite a large number of cases of various diseases for the relief of this aggravating, and at times serious, symptom. In a large proportion of the cases so treated the relief was prompt and satisfactory, but in others it was only transitory or entirely absent. In thinking over the subject it seemed logically conclusive to me that if cocaine could be combined with some remedy possessing analgesic and sedative effects, a more pronounced and persistent result would be obtained. Antipyrine, from its well-known influence in subduing pain, appeared to offer the greatest number of advantages for this purpose. Accordingly, for more than a year, I have treated cases of obstinate vomiting, whether due to central or to peripheral causes—vomiting caused by acute infectious or contagious diseases, as scarlatina, rubeola, etc., that due to acute indigestion, and other forms of gastric irritation, also the vomiting of pregnancy—by a combination of these two remedies, and have obtained better general results than by any other treatment; indeed, success often followed when our old, tried, and trustworthy remedies failed to afford relief. I trust, however, that no one will impute to me the claim of specificity for these remedies. They, like everything else, will fail at times, and this fact, in connection with their well-known potency, may render a caution against their indiscriminate use advisable, and impress the importance of carefully selecting cases in which the well-known physiological and therapeutic properties of the drugs are most clearly indicated.

The following cases will serve as examples of the effects produced:

CASE I.—On May 9, 1890, I was asked to prescribe for a woman suffering from obstinate vomiting of pregnancy. She had used all ordinary remedies without avail, and had become so weak that she could scarcely move about. She could not retain even a swallow of cold water. I gave the following:

℞.—Cocaine muriate (P. D. & Co.'s) 12 grains.
Antipyrine . . . 1 drachm.
Water . . . . 6 ounces.

One teaspoonful to be taken every half-hour until vomiting was relieved.

This acted promptly and effectively, and she was much elated over the result.

CASE II.—S. B., aged seven years. In this patient every systemic disturbance causes irritability of stomach, nausea and vomiting. In April, 1890, while passing through an attack of parotitis the vomiting was very severe, and the stomach would retain nothing. I prescribed:

℞.—Cocaine muriate (P. D. & Co.'s) 2 grains.
Antipyrine . . . 16 "
Water . . . . 2 ounces.

Of this she was directed to take half a teaspoonful every hour until vomiting ceased. A few doses produced the desired effect and she had no further trouble during the attack.

This child had a severe attack of measles about June 1st, attended during the pre-eruptive stage by obstinate nausea and vomiting, which were promptly relieved by a few doses of the same mixture.

CASE III.—On June 27, 1890, D. S., aged fourteen months, was suddenly taken with a severe attack of acute indigestion, attended by free emesis. Though the vomiting removed all, or the greater part, of the offending material, marked gastric irritability persisted and everything swallowed was promptly ejected. There was considerable fever (pulse 150), and intense thirst, which was aggravated by the inability to retain even small quantities of nearly ice-cold water. I gave $\frac{1}{24}$ grain cocaine and $\frac{3}{4}$ grain antipyrine in aqueous solution and repeated the dose in an hour. Fifteen minutes after taking the first dose the child drank water freely and suffered only slightly from nausea; a little later he nursed, and vomiting caused no further trouble. Two grains of calomel given in the evening produced free catharsis the following morning. This, together with the treatment above indicated, and careful regulation of the diet, were the only therapeutic measures employed, and resulted in a prompt and satisfactory recovery.

While the size of the dose and the frequency of administration have been varied to meet the exigencies of particular cases, I have obtained the best results from small, frequently repeated doses. My standard for an adult has been: cocaine ⅛ grain, antipyrine 1 grain, in aqueous solution every half-hour or hour as required.

While not pertinent to the subject just considered, I will take this opportunity to state that I have found concentrated solutions composed of five per cent. and fifteen per cent. each of cocaine and antipyrine, far superior as a local anæsthetic, to cocaine alone. The effect is more decided and much more persistent. I have used this solution with highly satisfactory results in minor surgical operations, also for obtunding the sensibility of the gums before extracting teeth. If, before the latter operation, this solution be thoroughly applied to the gums for about fifteen minutes, and the region of the external auditory meatus (a method first suggested, I believe, by a French physician) be well sprayed with ether, the extraction of teeth is attended by very slight pain.

For an external operation, where a more decided anæsthesia than can be obtained by simple application to the surface is desired, the effect can be greatly enhanced by applying the solution to the part to be operated on by means of a galvanic current strong enough to produce a decided impression. For this purpose a galvanic battery should be used, as it is needless to say the ordinary faradic battery or electro magnetic machine has but slight effect.

MEDICAL PROGRESS.

The Extraction of Unripe Cataract.—In the Berlin Medical Society, July 2, 1890, PROFESSOR SCHWEIGGER read a paper on this subject, discussing at some length the vague and varying views as to what constituted "ripeness," and claiming that the term and its practical outcomes are now largely obsolete. The importance of the matter, as is well known, lies in the question whether the lens can be wholly removed in the operation; for not only will portions of the unripe lens-substance cling to the capsule, and by their later opacity annul the benefits of the operation, but the presence of these swelling masses will often give rise to serious or destructive inflammations. The usual criterion, that the lens is opaque to the periphery, and that no shadow is cast by the iris in oblique illumination, he holds to be erroneous; since much time may be needlessly lost and the patient kept waiting in blindness for this stage, long after the eye is ready for the operation. He regards the age of the patient as the sole basis for judgment. In that period of life when the accommodation is annulled by the physiological changes in the lens, that is, toward the close of the fifth decade, and quite surely after the sixtieth year, we can extract any cataract as soon as defective vision makes the operation desirable, even if the greater part of the lens is still unclouded. In this case it is necessary to combine iridectomy with the extraction, and the old classical flap-operation with the retention of the normal pupil, to which Schweigger returned some years ago, finds here a valuable field. At earlier periods the question is more difficult, and the old criterion has weight. Total opacity is important, and here artificial ripening has its place: v. Graefe's discission, carried deep into the lens, being better before the fortieth year, but after that age Förster's trituration of the lens-cortex is preferable. Neither procedure needs iridectomy; and the extraction can generally be done from four to five days after the discission, or from one to two weeks after the trituration.

In the discussion, Professor Hirschberg, while concurring in most points, was still more radical. After the fortieth year any cataract is hard, or at least the nucleus is, and through an ample section any lens can be cleanly extracted whether the cortex is ripe, immature, or hypermature.—*Centralblatt f. prakt. Augenheilkunde*, July, 1890.

Ulcerative Stomatitis.—DR. NIL J. SOKOLOFF (*Vratch*) describes an epidemic of ulcerative stomatitis in which he saw thirteen cases, all adults. In nearly all, the tonsils and posterior wall of the pharynx were simultaneously affected. The disease usually commenced with intense malaise, vomiting, diarrhœa, and fever. In severe cases the fever lasted during the whole course of the affection, its type on the whole resembling enteric fever, while in mild cases the temperature returned to the normal about the end of the first week. In some patients abscesses under the tongue, or in the organ itself, were observed; in two, an erythematous confluent rash occurred; in two, albuminuria was present. The liver and spleen remained normal in all cases. The duration of the affection varied between fourteen and fifty-six days. In one case direct infection was noticed—a patient who was recovering from some grave disease contracted ulcerative stomatitis from his neighbor. Bacterial examination revealed the presence of ordinary streptococci, but no specific microbes.

PROFESSOR SIMANOVSKY also describes eight cases of the disease. In two of the cases the ulcerative process was confined to the mouth, while in the remaining six the fauces or the pharynx was involved. The faucial lesions were usually limited to one side, the ulcer being either on the tonsils or half-arches. In one of three cases in which the urine was examined, albumin was discovered. Search for bacteria gave negative results. The treatment consisted in gargling and painting with a solution of potassium chlorate (1 drachm to 4 ounces), a two-per-cent. solution of boric acid, or a solution of salol made by adding two teaspoonfuls of a six-per-cent. alcoholic solution to a glass of water.—*Journal of Laryngology and Rhinology*, August, 1890.

The Proper Time to Administer Quinine.—In the *Annales de Thérapeutique Médico-Chirurgicales*, July, 1890, CHARPENTIER gives the following directions as to the administration of quinine:

1. The action of quinine is chiefly felt about six hours after its ingestion, and for this reason it should be given, not at the time of an expected malarial paroxysm, but six hours before.

2. In the case of quotidian fever the quinine should not be given six hours before the chill, but eight hours before, so that the full effect may be present two hours before the chill, for though the chill is the apparent onset, the real onset is still earlier.

3. When the fever is tertian, Charpentier thinks that the quinine should be used twelve hours before, and where it is quartan, eighteen hours before the attack is expected.

The drug should be given in massive doses, not in fractional doses, for the reason that it is rapidly eliminated by the urine, and in small amounts would have no effect; although when the stomach is too irritable to stand heroic amounts, fractional doses should be given every three-quarters of an hour.

Treatment for Ozæna.—COZZOLINI recommends the following powder for the treatment of this troublesome affection:

℞.—Salol . . . . 2 drachms.
Boric acid . . . 1 drachm.
Salicylic acid . . . 12 grains.
Thymol . . . . 5 "
Powdered talc . . . 3 "

Use as an insufflation.

—*Provincial Medical Journal*, August, 1890.

Theobromine as a Diuretic.—GRAM, in the *Annali di Chimica e di Farmacologie*, xi., 1890, sums up his opinions of this drug as a diuretic in heart and renal disease as follows:

1. Theobromine when pure is absorbed with difficulty, but its absorption is followed by pronounced diuresis. It is without action on the heart and provokes diuresis by a direct action on the kidneys.

2. If salicylate of sodium is combined with theobromine it facilitates the absorption of liquids and increases their elimination. The effects of theobromine are not disagreeable and the author noticed only one instance in a weak subject in which vertigo occurred.

The ordinary daily dose is 1½ drachms of the salt divided into 15-grain doses.

Retinol in the Treatment of Vaginitis.—BALZER, in the *Revue Obstétricale et Gynécologie*, July, 1890, writes of retinol, which is extracted from colophony by distillation. It is a hydrocarbon which presents itself in the form of a liquid of the consistency of linseed oil, and of the color of tan—dark-brown, or sometimes golden-yellow, according to its mode of preparation. Its reaction is acid and it evaporates slowly at ordinary temperatures. It is balsamic in nature, and possesses antiseptic powers. It has been used in America in gonorrhœa and metritis and similar diseases. When used in vaginitis it may be applied to the mucous membrane by means of an applicator and speculum, or on a tampon, and is particularly useful where vegetations are growing or recur after removal. When used on a tampon an excess acts very severely, and it is often best used by making it into a paste with boric acid and introducing a ball of this into the vagina or against the diseased spot. As the paste is very diffusible it may in some cases produce a good deal of pain and even intense inflammation.

So far, Balzer has not employed retinol sufficiently to recommend its use, but he expects to prove that it is valuable as an antiseptic, and as a cauterant and local application in certain cases of diseased mucous membranes.

Bromidrosis of Feet.—SCOTT recommends the following:

℞.—Biborate of sodium, Salicylic acid } of each 2 drachms.
Boric acid . . . 30 grains.
Glycerin at 86° F., Alcohol } of each 1 ounce.

Mix, and use as a wash three times a day.

This application is particularly useful in those cases where much maceration of the skin is present, and where remedies of other kinds have failed.

Amylene Hydrate in Epilepsy.—NACHE agrees with Wildermuth as to the value of amylene hydrate in epilepsy, even where bromides have failed, and where the attacks are not only very frequent but severe. He uses a 10-per-cent. solution of the drug, and gives from one to two tablespoonfuls a day (from 30 to 90 grains). Nache also believes that *petit mal* and nocturnal epilepsy are benefited by the drug.

Operative Treatment of Bubo.—PÖLCHEN, of Königsberg, gives the following directions for the treatment of bubo produced either by gonorrhœa or chancre:

After all antiseptic precautions are taken the bubo is to be incised in a line parallel to the longitudinal axis of the body, and not parallel to Poupart's ligament. The length of the incision should be about that of the swelling. After the gland is exposed, it is to be carefully dissected away from the surrounding tissues, care being taken to avoid the great vessels, and every portion of diseased tissue removed. The space surrounding the gland is now to be packed with iodoform-gauze while search is made for other diseased parts. At this time the hæmorrhage should be almost nothing. For the total destruction of the disease-process we may cauterize all the affected glands with caustic potash, using antiseptic gauze to protect the healthy parts, instead of scraping the glands. The advantages of the latter plan consist in the ease of the operation and its freedom from danger, while it is asserted that the dangers from general infection are much decreased by the action of the caustic and that the cure is completed in the majority of cases without fever. It is true, on the other hand, that healing is postponed a little longer than after the simple use of the knife. This inconvenience, is however, counter-balanced by the fact that the patient can return to his usual occupations almost at once, and the secretion from the wound amounts to almost nothing.

Treatment of Syphilis by Rectal Injections of Iodides.—According to the *Revue Générale de Clinique et de Thérapeutique*, the following formula may be used by the anus, whenever the stomach is disordered:

℞.—Iodide of potassium . . 15 grains.
Extract of belladonna . ¼ grain.
Water . . . . 4 ounces.—M.

The solution must be warm, and is said to be well borne and effective.

Treatment of Metrorrhagia by Ergotine Injections.—When ergotine is badly tolerated by the stomach, it is recommended that it be used in the following manner in metrorrhagia:

The bowel having been first evacuated of fæcal matter and the rectum washed out, a teaspoonful of the following is to be mixed with two tablespoonfuls of hot water and injected:

℞.—Ergotine . . . . 150 grains.
Distilled water . . . 2½ ounces.
Glycerin . . . . 6 drachms.
Salicylic acid . . . 6 grains.

—*Revue Gén. de Clin. et de Thérapeutique*, Aug. 6, 1890.

Treatment of Acne.—In the *Revue Thérapeutique Médico-Chirurgicale*, ISAACS recommends the following for acne:

℞.—Camphor, Vaseline, Beta-naphthol } of each . . 150 grains.
Precipitated sulphur . . 1½ ounces.
Green soap . . . . ½ ounce.—M.

Apply to the affected part for from three to fifteen minutes, according to its susceptibility. After using this lotion, use in its place, after thoroughly drying the skin:

℞.—Resorcin, Salicylic acid } of each . . 7 to 15 grains.
Oxide of zinc . . . . 30 grains.
Vaseline . . . . . 6 drachms.—M.

This is to be allowed to remain on all night, or a less time if it is too stimulating, and is itself to be followed by an emollient, such as cold cream or chalk powder.

Prescription for Flatulent Dyspepsia.—DR. PAUL CHÉRON prescribes the following powder to cases of flatulent dyspepsia:

℞.—Magnesia, Calcium phosphate, Powdered charcoal, Sulphur } equal parts.

A teaspoonful to be taken in water when necessary.—*Provincial Medical Journal.*

Hypodermic Injection for Delirium Tremens.—In *La Semaine Médicale*, July 30, 1890, the following formula is given:

℞.—Methylal . . . . 75 grains.
Distilled water . . . 5 ounces.
Mix, and use for hyppdermic injections.

This mixture is to be injected, hypodermically, in three or four doses during twenty-four hours, and its use continued for four or five days. It produces less evil effects under these circumstances than most of the drugs devoted to the treatment of delirium tremens. Fischer states that these injections are never followed by abscess, and may be employed when an attack of *mania-a-potu* is imminent, as a prophylactic measure.

Tests for Arsenic in Wall-paper.—The *British Medical Journal* describes the following simple tests for arsenic in wall-papers: Turn down an ordinary gas-jet until the flame is wholly blue. Then a strip of the suspected paper, about one-sixteenth of an inch wide, is brought in contact with the outer edge of the flame. If arsenic is present, a gray coloration will be seen in the flame, and, if the paper is burned a little more, a garlic-like odor can be detected in the fumes. If, on removing the paper from the flame, the charred portion is of a reddish color, copper is present (arsenic used for this purpose is usually in the form of arsenite of copper). On again placing the charred paper in the flame a green coloration, due to the copper, is seen.—*The Sanitarian*, July, 1890.

Treatment of Acute Vaginitis.—In the *Revue Générale de Clinique et de Thérapeutique*, July 2, 1890, ELOY gives the following treatment for vaginitis: He divides the disease into the initial or primary stage, and terminal or final stage.

For the primary condition he advises the employment of hot injections of liquid vaseline and cocoa-butter, combined with 300 grains of boric acid to each pint of this mixture, the injections to be made every few hours: This is to soothe the irritated parts.

In the terminal stages, when acute inflammation has passed, one of the following injections is useful:

Sulphate of iron . . . . 300 grains.
Distilled water . . . . 1 pint.

Or,

Chloral . . . . . 300 grains.
Distilled water . . . . 1 pint.

Or,

Permanganate of potassium . 2½ grains.
Distilled water . . . . 1 pint.

After several days, if the discharge persists, the vagina should be packed with cotton tampons saturated with glycerole of tannin made as follows:

Tannic acid, Glycerin } of each . . 2 drachms.

After each removal of these, the mucous membrane should be touched with a strong solution of silver nitrate.

Nylander's Test for Glycosuria.—DR. BRANDRETH SYMONDS advocates the use of Nylander's solution in testing for sugar in the urine (*New York Medical Journal*, July 12, 1890). The solution consists of bismuth subnitrate, 31 grains (2 grammes); Rochelle salt, 62 grains (4 grammes), dissolved in 3⅓ ounces (100 c. c.) of a 10-per-cent. solution of sodium hydrate. On boiling this with glucose a dark-brown or black precipitate of bismuth suboxide and metallic bismuth is produced. The most delicate mode of applying the test is to half-fill a test-tube with urine, then add about one-third of the solution. Boil the upper layers, watching for any reduction.

Though less delicate than Fehling's test, detecting only a tenth of one per cent., it has the advantages of not changing, even when kept for a long time, and of not giving a reaction with chloral, pyrocatechin, or glycosuric acid. Dr. Symonds thinks the test sufficiently delicate for ordinary clinical work, and is the one which he usually applies.

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PURULENT CAPILLARY BRONCHITIS IN THE PHTHISICAL, DUE TO THE PNEUMOCOCCUS.

EVERY physician of large clinical experience with the phthisical must have observed many cases in which the more or less sudden termination has seemed to be due to something above and beyond the mere tuberculous condition. That is to say, either physical examination fails to show—and autopsy to reveal—an extent of pulmonary infiltration or destruction sufficient to necessitate a fatal issue at that time, or even to account for the severity of the constitutional symptoms; or, on the other hand, while conditions of great pulmonary destruction have long been recognized, yet the final breaking-down of vital powers in general, is of a suddenness not to have been expected from the slow progress of the chronic disease. The most plausible explanations hitherto offered for the phenomena are sudden, generalized infection from penetration of bacilli into the circulation, or lethal intoxication with ptomaïnes.

An investigation recently undertaken by MM. DUFLOCQ and MENETRIER (*Archives Générales de Médecine*, June and July, 1890) throws a certain amount of new light upon the subject. In the course of their researches into the pathogenetic activities of the pneumococcus, other than as the cause of pneumonia, they have observed clinically, and examined post-mortem, a number of cases of phthisis, upon which an acute capillary bronchitis had supervened, apparently from secondary infection, which they attribute to the pneumococcus.

At the autopsy they have invariably found the lesions of the tuberculous and bronchitic infections coëxisting, but not coëxtensive; the anatomical relations being such as to leave no doubt of the priority of the tuberculous process. While the lesions of tuberculosis were found principally in the upper lobes, the capillary bronchitis involved the middle and inferior portions of the lung; that is to say, regions relatively free from bacillary localization. The bacillus was always wanting in the pus of the bronchioles, while the pneumococcus was encountered only exceptionally and in very small number, in the liquid contents of cavities. Having determined beyond doubt, by culture and by inoculation, that they were dealing with the veritable pneumococcus, the authors ask, Why is it that this microbe gave rise in the cases under consideration, not to pneumonia, but to capillary bronchitis? The answer they give is, in brief, that while ordinarily the pneumococcus must act in conjunction with other pathogenetic parasites—as, for example, the streptococcus or the pneumo-bacillus of Friedländer, or some more common pyogenetic germ—yet in these particular cases it was the sole agent in the infection; the irritation produced by the presence of the tubercle bacillus and the passage of tuberculous fluids over the bronchial mucous membrane having rendered the tissues vulnerable without other intervention.

If these observations are correct, it will readily be seen how a comparatively limited and quiescent pulmonary tuberculosis can be suddenly converted by this additional infection into a very grave and dangerous condition. Such additional infection will explain the heightened fever, the renewed symptoms of septic toxæmia, and the physical signs of obstructed respiration and impaired circulation disproportionate to the extent of the existing tuberculous lesion.

In these remarks, as in the researches quoted, the well-known liability of the subjects of slow, chronic phthisis to sudden and frequently fatal pneumonia has not been under consideration.

STOMACH-WASHING IN CHILDREN.

STOMACH-WASHING in the treatment of the gastric disorders of childhood has been practised chiefly by

Epstein, and in this country, to a limited extent, by Seibert and a few others. Recently DR. WILLIAM D. BOOKER (*Johns Hopkins Hospital Bulletin*, July, 1890) has used the method in the treatment of nearly two hundred cases of gastro-intestinal disturbances in children, all the cases occurring in hospital or dispensary practice. Although, as Booker himself writes, it is too early to estimate the exact position of the procedure in the therapeutics of childhood, it is undoubtedly of great value in the treatment of certain conditions.

Booker's observations seem to show that stomach-washing is of especial value for the relief of vomiting due to indigestion. In many of his cases relief was immediate, and in only one case was it necessary to stop giving milk. The vomiting of dysentery was less markedly influenced, though in some cases it was checked. In the summer diarrhœas benefit often followed the washing, and was evidently due to the fact that undigested food was prevented from entering the intestines. In some of the latter cases, however, the curative influence was very slight. A few cases of constipation due to gastro-intestinal catarrh were also improved by systematic stomach-washing.

The apparatus used by Booker was a Nélaton catheter, No. 8, 9, or 10, attached by a rubber tube two feet long to a two-ounce glass funnel. To perform the operation properly the child should be held in a sitting position on the nurse's lap, with the head slightly inclined forward and the hands confined by the nurse's left arm. The tube, moistened with water, is then steadily passed back to the pharynx and downward into the stomach. Gagging may be produced when the end of the catheter reaches the pharynx, but usually ceases when it reaches the stomach. One or two ounces of water are then poured into the funnel, held above the child's head, and the moment the funnel becomes empty it is lowered and the contents of the stomach siphoned out. This should be repeated until the water returns clear.

Booker also made some interesting observations upon the contents of the stomach in normal and in disordered digestion, but it is to the therapeutical aspects of the subject that we wish to direct attention, and to advise washing out the stomach in the treatment of gastro-intestinal diseases in children, *after* careful regulation of the diet and other measures have failed. We do not believe that it will, or should, supplant other methods of treatment, but that it is a valuable addition to our resources in the management of serious and often obstinate diseases.

THE NEW SURGEON-GENERAL.

DR. JEDEDIAH H. BAXTER, formerly Chief Medical Purveyor of the United States Army, has just been appointed its Surgeon-General, and we congratulate the President upon his wisdom in making such an appointment. While it has been claimed by certain opponents of Dr. Baxter that he has never seen much active frontier service, it nevertheless remains a fact that such service is not the training necessary to make a good surgeon-general, who needs executive ability and experience in matters closely connected with what Dr. Baxter has been accustomed to attend to since the war. Further than this, his prolonged residence in Washington has given him complete information as to the central management of the service, and his executive ability must soon make itself felt now that he has succeeded Surgeon-General Moore, and has at last reached a rank where he may use his powers. Promotion according to rank is a custom too often disregarded, and we are glad that in this instance at least the regular line of promotion was followed out. Dr. Baxter has before him a period of many years before the retiring age arrives, and we are confident that these years will be used for the good of the service.

SPECIAL CORRESPONDENCE.

THE POLICY OF SURGEON-GENERAL BAXTER.

To the Editor of THE MEDICAL NEWS,

SIR: On the 28th ult. the Senate wisely confirmed the appointment of Colonel Jedediah H. Baxter to the Surgeon-Generalship of the United States Army, vice Surgeon-General John Wood, retired. General Baxter's service of over thirty years in the Army, twenty-five of which were in the administrative department, his sequence in line of promotion, and his well-known ability amply warrant the appointment.

The long period during which Dr. Baxter will fill the highest office within the medical department of the Army renders the lines upon which the service will be conducted a matter of interest beyond the circle of army surgeons. Your correspondent, therefore, is happy to be able to assert authoritatively, that increased effort will be made to improve the efficiency of this arm of the service.

To this end, examinations for admission to the service will aim to test more thoroughly than heretofore the practical ability of the applicant, rather than his fund of theoretical knowledge, and in all cases a sound general education will be an essential for appointment. Previous hospital experience will rate more highly than heretofore in an applicant's qualifications, and will be esteemed

in accordance with its length and the standing of the institution. The physical condition of the applicant will be inquired into as strictly as is the case in other arms of the service. The necessity of this measure has been evinced by the proportion of appointees who, after a few months of active service, become physically disqualified.

Another plan that cannot fail of excellent effect is, that assistant surgeons after a reasonable term of service at isolated posts shall be given leave of absence for the purpose of "brushing up" their medical knowledge by attendance at post-graduate and hospital courses in the larger cities.

Rapid promotion and the consequent increased pay will render the position of army surgeon more attractive and induce an increased number of applicants. With this object in view, it is Surgeon-General Baxter's intention to secure the adoption of measures that will enable disabled surgeons to enter upon the retired list without the vexatious delays now experienced, and thus reduce the number of contract-surgeons employed. When the latter are required, a much more strict preliminary examination will be enforced than has been the custom in the past.

These are but a few of the many plans Dr. Baxter entertains for the benefit of the department of which he is the head. Many others concern minor matters of detail of little general interest, others are not yet sufficiently developed to entitle them to publication; but that all will prove for the benefit of the service and for the welfare of its officers, the long experience and tried ability of Dr. Baxter are ample guarantee.

WASHINGTON, D. C., August 30, 1890.

BRIGADIER-GENERAL J. H. BAXTER was born in Strafford, Vermont, May 11, 1837. He is the son of the late Hon. Portus Baxter, who represented the Third District of Vermont in Congress during the War of the Rebellion.

General Baxter was graduated from the University of Vermont, receiving the degree of A.B. in 1859, and that of M.D. in 1860. He is also a graduate of the Law Department of the Columbian University of the District of Columbia.

Dr. Baxter entered the army at the outbreak of the war, as surgeon of the 12th Massachusetts Regiment of volunteers, and was mustered into the United States service June 26, 1861. He has been in continuous service in the volunteer and regular army from that time.

He was promoted to be Brigade Surgeon, U. S. Volunteers, April 4, 1862, and served in the Peninsular campaign with the Army of the Potomac, on the staffs of Generals Banks and McClellan. He was taken ill with fever while on duty in the field and ordered to Washington.

Having partially recovered, he was assigned to the charge of Campbell Hospital, Washington, D. C., one of the largest United States General Hospitals during the war. He organized the hospital, which contained about 1500 beds, and was in full charge until January, 1864, when he was called by the order of the Secretary of War Stanton to take charge of the medical department of the Provost Marshal General's Bureau, at the request of General James B. Fry, the Provost Marshal General.

On the reorganization of the regular army on a peace-footing, after the close of the war, the services of volunteer officers who had achieved distinction during active service were recognized in filling original vacancies created by Congress in the several staff departments, which had been increased commensurate with the growth of the standing army.

Surgeon Baxter was appointed Assistant Medical Purveyor, with the rank of Lieutenant-Colonel, July 20, 1867, and March 12, 1872, was appointed Chief Medical Purveyor with the rank of Lieutenant-Colonel; and Chief Medical Purveyor with the rank of Colonel, June 23, 1874.

He has been the senior officer in the Medical Department, next to the Surgeon-General, for many years, and on the retirement of Surgeon-General Moore, August 16, 1890, the President, on the same day, sent to the Senate the name of Colonel Baxter to fill the vacancy. He was unanimously confirmed by the Senate, August 27th.

SOCIETY PROCEEDINGS.

THE GYNECOLOGICAL SOCIETY OF CHICAGO.

Stated Meeting, April 18, 1890.

THE PRESIDENT, JAMES H. ETHERIDGE, M.D., IN THE CHAIR.

DR. FRANKLIN H. MARTIN exhibited a cancerous uterus that he had removed by vaginal hysterectomy. The cervix was first thoroughly scraped away to as near the healthy tissue as possible. In about three weeks the disease returned. When it began to involve the vagina, Dr. Martin advised the operation of vaginal hysterectomy, which was done, January 15, 1890. The bases of the broad ligaments were ligated with silk, and for the remaining portion of each broad ligament clamp-forceps (Byford's pattern) were used. The operation was performed without difficulty or complications, and the patient was discharged in about four weeks. On April 16th, there was still no recurrence.

DR. HENRY T. BYFORD then showed a suppurating kidney. The patient was thirty-one years old; married for five years, and had had no children. She had been subject to periodic attacks of septic fever for more than a year. The temperature would reach 103° to 104° F. during the attack, with great tenderness in the right side of abdomen. After a discharge of pus and granular material with the urine, the symptoms would subside for a time. The organ was felt to be enlarged at each examination.

The kidney was removed through an incision made in the linea semilunaris, through which the other kidney was first palpated and found to be healthy. The tissues about the diseased one were healthy, but the uterine appendages were extensively diseased. He completed the operation by establishing drainage with iodoform-gauze through a small opening in the lumbar region, and closed the abdominal incision completely. The

ureter was ligated with fine silk at about one and one-half inches from the kidney, and placed so that any suppuration that might arise from it would find its way out through the lumbar opening. The temperature remained between 99° and 100° F. for a few days, and then became normal.

Dr. Byford also showed a specimen of probable sarcoma of the uterus and one of fibroma of the uterus. The patient with the sarcoma was at about the period of the menopause. The tumor was growing rapidly and causing pain, and the bloodvessels about the uterus were exceedingly large. He based his diagnosis upon the appearance of the tumor, the excessive vascularity, the absence of a capsule, and the manner in which it was attached to the bladder. Microscopical examination had not yet been made.

In the case of the fibroma, the diagnosis was obscure. Ten years previously the condition had been diagnosed and treated as pelvic inflammation and pyosalpinx. The abdomen, when the patient was seen by Dr. Byford, was so tympanitic that it was impossible to make a satisfactory bimanual examination. The patient was taking liquor and opiates, was very nervous, and was losing ground. This was the sixth case that Dr. Byford had operated upon by the following method:

The broad ligaments are tied off, the uterus amputated below the tumor, and the stump sewed up somewhat after Schröder's method, but with catgut and silkworm-gut. The bladder is separated, and an opening made into the vagina through the anterior fornix at the junction with the cervix. The silkworm-gut sutures are used for traction, and the cervix is drawn down and forward into the vagina and a clamp put on through the vagina. He usually holds the stump loosely with clamps, so that the apposed surfaces may heal up, as after trachelorrhaphy. As in all his earlier cases but the second the edges sloughed, he now prefers ligating rapidly with silk, and clamping firmly with a hollow clamp, so that the slough will separate early and come off in the clamp. The clamp prevents the contact of the slough with the patient's tissues, and avoids septic trouble.

After the stump is turned down he sews the peritoneum from behind the bladder to the posterior wall of the cervix. There is no raw surface left for extensive adhesive inflammation in the pelvis, with its consequent peritonitis and obstruction of the bowels. He has used drainage in all of the cases but one, because he does not usually operate on simple fibroids, there being generally some disease in the broad ligament and an oozing surface left. When he puts on the clamp from below he inserts a finger from above in the cul-de-sac of Douglas behind the cervix and a thumb in front of it, then pushes a pair of hæmostatic forceps up from the vagina through the anterior fornix between his thumb and the cervix, and enlarges the rent by scissors-snipping and stretching.

In discussion, DR. PARKES said that he regarded the specimen of kidney as very interesting and unusual in the length of time that it had existed without following the usual disposition of such diseases toward external suppuration. The only explanation of this is the peculiar enlargement of the ureter, which enabled it to carry the accumulated matter in the pelvis of the kidney into the bladder. Usually in suppurating kidney almost the first manifestation is the formation of a tumor and the development of a perinephritic abscess which opens externally. Surgeons have always found difficulty in the removal of such kidneys, on account of the surrounding cicatricial tissue. It is almost a rule, he said, that suppurating kidneys should not be removed, and this rule is sustained by the results in many cases. But this case was very exceptional in that there were no surrounding complications; all the trouble was inside the kidney and could be attacked without the usual difficulties. He had always dreaded to remove them, on account of the complications arising from the presence of adhesions and the danger of septic poisoning, and has adopted the plan of laying them widely open, which is not very satisfactory, as the patient often apparently recovers, but the disease returns, owing to the many pockets in which pus accumulates. The idea of continuous irrigation has suggested itself to him in these cases.

DR. MARTIN said that he had had the pleasure of witnessing two of these operations by Dr. Byford with his method of treating the stump. The only objection that could be offered to the operation is that, for a nervous, rapid operator, the procedure is altogether too long. Dr. Byford spends from two and a half to three hours in performing this operation, and the abdominal cavity is perfect after the stump is secured.

In the discussion which followed a paper by DR. T. J. WATKINS on the

AFTER-TREATMENT OF ABDOMINAL SECTION,

DR. JAGGARD said that he was particularly interested in the allusion to ether as a renal irritant, and the reader's reference to two cases in which ether was responsible for fatal nephritis. Dr. Jaggard thought that this was one of Emmet's ideas and that the evidence that ether was a renal irritant had never been proven. Dr. Weir, of New York, has published a very interesting paper on the effect of ether upon the kidneys, and the results show that ether employed as an anæsthetic is not a renal irritant. In not one case has Dr. Weir been able to establish the fact that ether produces more irritation of the kidney than does any other extremely volatile substance. It would be interesting, he said, if Dr. Watkins would give the evidence upon which he based his conclusion that ether was responsible for two cases of fatal nephritis. Can he exclude septic infection? Dr. Jaggard also said that he had used ether in a number of cases of puerperal convulsions, contrary to the teaching of Emmet, and that he had never seen bad effects. He considers ether given hypodermically a valuable diffusible stimulant in chloroform-narcosis, and has never seen local irritation when the hypodermic needle was sterilized.

In regard to the length of time that a woman should remain in bed after an abdominal section, he described two cases. In one the woman, two weeks after the operation left her bed, travelled five miles in a carriage, and, a week later, died of peritonitis. In the other case the woman went home by railway, eighteen days after the operation. On the journey the incision opened and the intestines protruded. The incision was closed again by her family physician, and she recovered.

DR. PARKES referred to the fact that after abdominal section the temperature might rise even to 104°, from no

other cause than constipation. In such conditions he does not believe that the administration of antipyretics is proper, though, if there are general symptoms such as malaise and headache, he advised cold sponging.

DR. DUDLEY spoke of the management of abdominal section in the Woman's Hospital of New York, when he was an interne in the institution, fifteen years ago. At that time patients were kept on a restricted diet during the week preceding the operation. They were also given large doses of quinine, and, to prepare the system for the shock of the operation, large doses of opium. These drugs were continued after the section. The percentage of deaths was enormous, though, of course, many died from the absence of asepsis.

Dr. Dudley also said that he had adopted the enema—a half-ounce each of glycerin, sulphate of magnesium, and water—recommended by Dr. Watkins for the treatment of tympany, and that it had proven very satisfactory.

DR. BYFORD said that he had frequently noticed that a patient who had been long under ether—two or three hours—was less likely to vomit than a patient who had taken comparatively little ether. He did not consider it a good rule to take out the drainage-tube in twenty-four hours, nor did he think that the stitches should be removed in six days.

In closing the discussion, DR. WATKINS said that he still adhered to the belief that the drainage-tubes should be removed early, for, if fluid remains in the abdominal cavity, it will well up through the track of the tube.

He was unable to see any reason for the opinion expressed that etherization does not produce nephritic congestion. No one doubts that ether is eliminated by the kidneys, and that when given in small amounts it has an active diuretic effect. It is, moreover, a therapeutic fact that all active diuretics, when given in excess, produce nephritic congestion. Scanty secretion of urine, pain in the region of the kidneys, nausea, and cephalalgia not infrequently follow etherization, and these symptoms are usually relieved by increasing the functional activity of the kidneys.

In regard to the method of etherizing, he said that, though the Clover inhaler is theoretically bad, practically it works well. When properly used, not more than two ounces of ether are necessary for the first hour, and frequently one ounce suffices for an operation. The liability to vomit is much lessened when little ether is used, and congestion of the kidneys and air-passages is necessarily much less frequent.

CORRESPONDENCE.

LONDON.

The Annual Meeting of the British Medical Association. The Address of the President. Mr. Lawson Tait's Address. Professor Hamilton on Acid Dyspepsia.

To the Editor of THE MEDICAL NEWS,

SIR: The annual meeting of the British Medical Association has, of course, been overshadowed by the International Congress at Berlin; but, nevertheless, the gathering at Birmingham was one of considerable importance, and deserves some recognition. In the first place, it was evident that the ill-feeling in a certain quarter last year against the Association, which led to the resignation of some seventy members, had not had any permanent damaging effect on the Association. Dr. Wade, one of the oldest practitioners, and certainly the most distinguished physician in Birmingham, was elected President and worthily upheld the dignity and traditions of the office. His address dealt almost entirely with medical education, the important medico-political problem of the day. The General Medical Council has, in its wisdom, decreed that at no very distant date the medical curriculum shall be at least five years, instead of four, as at present, and has proposed a scheme by which the first year shall be entirely devoted to physics, chemistry, biology, etc. Dr. Wade is not quite satisfied with this arrangement, and would like to see two years devoted to the study of the preliminary sciences, as we may call them. He thinks that the study of these subjects should be commenced at the age of fifteen, as by that time a boy has had ample opportunity for a sufficient general education. One difficulty with this plan is that the majority of boys at the age of fifteen have not decided what profession to follow. In cases where they have arrived at this decision, there can be no question that it is greatly to their advantage to begin the study of the sciences at an early age.

As to the main question of what is to be done during the additional year, I am in hopes that the time will be added to the end and not to the beginning of the curriculum, for I am quite sure that our students are much more in need of additional clinical work than of preliminary study, and I would make the extra year count only from the time of passing the final examination. So long as students have an examination before them the majority will make no attempt to learn anything but what is necessary to enable them to scrape through the examination; and it is my firm conviction that the addition of a year at the commencement of the medical curriculum will not make them one whit better practitioners than they are under the present *régime*.

Mr. Lawson Tait, who delivered the Address in Surgery, which, it goes without saying, was both vigorous and practical, denounced very strongly the unpractical character of the teaching of the present day and the enormous amount of time wasted upon the biological training of the modern student. He would like to return to the old system of apprenticeship; but, although many of our leading practitioners of the present time were educated under that *régime*, and are never weary of advocating it, I do not anticipate that it will ever be reintroduced. If a system of apprenticeship at the end of the curriculum could be established, it would, I believe, be of great service.

One of the most important papers read at the meeting was that of Professor Hamilton, of Aberdeen, on "Acid Dyspepsia." His main point was that the disturbance was, in the first instance, one affecting mainly the quantity or the quality of the gastric juice. Variations in the quantity of the hydrochloric acid in the gastric juice are exceedingly common, and it is chiefly on these variations that the symptoms of dyspepsia depend. The second cause arises from a deficiency in the quantity of hydrochloric acid and the formation of lactic acid in

excess. Normally, lactic acid is formed in only very minute quantities. So that acid dyspepsia may be the natural consequence of a too abundant formation of hydrochloric acid in the stomach, or of a deficient formation of it; and the recognition of these two forms is, of course, all important in treatment, as it is obvious that they will require different measures.

An active discussion followed Sir Dyce Duckworth's paper on "Functional Disorders of the Heart."

Of course, the social festivities and entertainments were not neglected at this meeting, and the hospitalities of the Mayor and other local celebrities cannot have failed to leave a pleasant recollection on the minds of the twelve hundred members who received them. This is the fourth time that Birmingham has been the meeting-place of the Association; and since its last meeting there, seventeen years ago, the Association has trebled its membership, now including in its roll more than half the practitioners in the United Kingdom.

NEW INVENTIONS.

A NEW SET OF REFRACTION LENSES.

BY H. F. HANSELL, M.D.

I HAVE recently had made a set of test-lenses adapted to the needs of medical men who do not practise ophthalmology as a specialty. It contains comparatively few lenses (50—Natchez 212), yet so arranged that, either singly or in combination, all practical strengths of spherical and cylinders may be obtained, and all remediable errors of refraction corrected. The advantages are low cost, light weight, and small size; the single disadvantage is the slightly greater expenditure of time necessary in adjusting the lenses, as compared with the larger cases.

The plus and minus spherical lenses are pairs of 0.25 and 0.50, singles of 0.75, 1, 1.50, 2, 3, 4, 8, 13; cylinders, singles of 0.25, 0.50, 0.75, 1, 1.50, 2, 3, 4; prisms, 1°, 2°, 4°, 8°, 20°. The box contains a Natchez frame so modified that it will hold in position four lenses on each side at the same time. The case is made and sold by Borsch & Rommel, 1324 Walnut St., Philadelphia.

NEWS ITEMS.

Examinations for Appointment in the Medical Corps of the United States Army.—An army medical board will be in session in New York City during October, 1890, for the examination of candidates for appointment in the Medical Corps of the United States Army, to fill existing vacancies.

Persons desiring to present themselves for examination by the board will make application to the Secretary of War, before October 1, 1890, for the necessary invitation, stating the date and place of birth, the place and State of permanent residence, the fact of American citizenship, the name of the medical college from whence they were graduated, and a record of service in hospital, if any, from the authorities thereof. The application should be accompanied by certificates based on personal knowledge, from at least two physicians of repute, as to professional standing, character, and moral habits. The candidate must be between twenty-one and twenty-eight years of age, and a graduate from a regular medical college; as evidence of which, his diploma must be submitted to the board.

Further information regarding the examinations may be obtained by addressing Surgeon-General J. H. Baxter, U. S. Army, Washington, D. C.

Foreign Students in France.—The *Gazette Médicale de Paris* gives the following figures in regard to this question: The foreign students registered in the faculties of medicine for the scholastic year of 1889–90 numbered 908. Of these Paris has 822, made up as follows: 6 Germans, 51 English, 7 Austrians, 7 Belgians, 8 Bulgarians, 34 Spanish, 34 Greeks, 6 Dutch, 12 Italians, 1 Norwegian, 18 Portugese, 85 Roumanians, 261 Russians, 25 Swiss, 71 Turks, 159 Americans, 13 Egyptians, 1 Persian, 1 Australian.

Bordeaux has 17 foreign students, of whom 2 are English, 2 Belgians, 1 American, 1 Egyptian, 5 from Mauritius, 5 from Argentine Republic, and 1 from Cuba.

Lille has 3 foreigners: 1 English and 2 Russians.

Lyons has 8 foreigners, namely, 1 Russian, 2 Swiss, 3 Turks, 2 Egyptian.

Montpelier has 53 foreigners: 2 English, 14 Bulgarians, 3 Spaniards, 7 Greeks, 1 Italian, 2 Roumanians, 4 Russians, 16 Turks, 4 Egyptians.

Nancy has 4 foreigners, namely, 3 German and 1 American.

In *résumé* we have 907 foreign students, as follows: 9 Germans, 56 English, 7 Austrians, 9 Belgians, 22 Bulgarians, 37 Spaniards, 41 Greeks, 6 Dutch, 13 Italians, 1 Norwegian, 18 Portugese, 87 Roumanians, 268 Russians, 27 Swiss, 90 Turks, 161 Americans, 19 Egyptians, 5 Mauritians, 1 Persian, 1 Australian, 5 Argentine Republicans, and 1 Cuban.

American Rhinological Association.—The American Rhinological Association will hold its eighth annual session at Louisville, Ky., October 6, 7, and 8, 1890.

Many subjects relating to nasal and naso-pharyngeal diseases will be opened for discussion by Fellows of the Association. The medical profession is cordially invited to attend.

The Secretary, Dr. S. Knode, Omaha, Nebraska, will furnish any information to physicians desiring to become members.

Dr. John K. Mitchell has returned to Philadelphia after a long absence made necessary by an attack of typhoid fever last autumn, and has moved into a new office at No. 211 South Seventeenth Street.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING AUGUST 30, 1890.

HOEHLING, A. A., *Medical Inspector.*—In addition to present duties, ordered as President of Medical Examining Board at Philadelphia, convened by Department Order, June 9, 1890.

KENNEDY, R. M., *Assistant Surgeon.*—In addition to present duty, ordered as member of the above Board.

OGDEN, F. N., *Passed Assistant Surgeon.*—In addition to present duty, ordered as member of the above Board.

MCCLURG, WALTER A., *Surgeon.*—Granted a month's leave of absence from September 1st.

KERSHNER, EDWARD, *Surgeon.*—Granted two weeks' leave of absence from September 1, 1890.